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Knitted Outerwear Times

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Vol. 29 MONDAY, MAY 9, 1960 No. 19

Kintner Stresses FTC Position On Ad Allowances

The position of the Federal Trade Commission on advertising allowances and other exactions by retailers in violation of the provisions of the Robinson-Patman Act was underscored by Earl W. Kintner, FTC chairman, before the luncheon audience at the annual convention of the National Knitted Outerwear Association on May 5. (Editor's Note: Full text of Mr. Kintner's talk will be published next week.)

Mr. Kintner pointed out that "I think it is fair to say that one of the general purposes of the statute was and is to prevent large buyers from using their economic power to extract favorable prices which are not granted to others less powerful and are not justified by savings to the seller resulting from differences in cost of manufacture, sale or delivery."

Section 2(d) of the Act, Mr. Kintner said, "declares it unlawful to grant an advertising allowance to any customer unless such allowance is 'available on proportionally equal terms to all other customers competing in the distribution of' the products or commodities sold."

The FTC chairman went on to say that recently he has heard that "'allowances' are frequently demanded on sales of merchandise and collected by the buyers even though the allowances are not actually used for advertising but are pocketed by the buyers as partial or complete discounts from the price of the merchandise.

"In the nature of things,"

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JAMES F. NIELDS

IRVING SALTZMAN

Association Board Elects Nields To Head NKOA For Second Term

James F. Nields, Ware Knitters, Inc., Ware, Mass., was re-elected president of the National Knitted Outerwear Association at the annual board meeting held Wednesday at the Waldorf-Astoria Hotel. The board also re-elected Irving Saltzman, Premier Knitting Co., treasurer of the Association for the 22nd consecutive term.

David Reinthal, Bamberger-Reinthal Co., Cleveland, was elected a vice president. He succeeds Oscar Fisher, Standard Knitting Mills.

Vice presidents re-elected included Ingram Bergman, Bergman Knitting Mills, Philadelphia, Pa.; Israel M. Cohen, Suffolk Knitting Co., Lowell, Mass.; Edwin A. Kalfahs, Jersild Knitting Co., Neenah, Wis.; Irving Louis, Irwill Knitwear Corp., New York City; and John Miller, Catalina, Inc., Los Angeles, Calif.

Members of the board of directors of the various district associations are as follows:

Eastern District: Milton Davis, Wooly Togs Corp., New York City; Sol Freeman, Queen Knitting Mills, New York City; Robert Seckler, Shepherd Knitwear Co., Philadelphia; Morris London, Commodore Knitting Mills, Brooklyn; David Aronow, Lee Beachwear Corp., New York City; Morris J. Kasper, Central Knitwear Co., New York City; Ben Kaplan, Mayflower Knitting Mills, Brooklyn; Morris Philip, Philip Knitting Mills, Bronx, N. Y.; and George Vargish, Vargish Knitwear Co., Union City, N. J.

New England District: Joe Emple, Emple Knitting Mills, Bangor, Me.; Louis G. Stoloff, New Knit Mfg. Co., Lowell, Mass.; and Saul O. Sidore, Brookshire Knitting Mills, Manchester, N. H.

Pennsylvania District: Harold L. Neuman, Robert Bruce, Inc., Philadelphia; Max E. Falik, Charles Peberdy & Sons, Philadelphia; Gideon Frankil, Union Knitting Mills, Philadelphia; David Rosenblatt, Forrest Knit-

(*Continued on Page* 41)

NKOA Banquet Attendance Hits IndustrywideHigh

A record number of members from the knitted outerwear industry and allied supply fields met at the 42nd annual banquet of the National Knitted Outerwear Association on May 5 in the Grand Ballroom of the Waldorf Astoria Hotel, New York City. The more than 1600 persons who attended the industrywide event were addressed by U. S. Senator William Proxmire, Wisconsin Democrat.

The banquet brought to a close the annual two-day convention of the Association, which opened on Wednesday morning, May 4, with an all-day meeting of the NKOA board of directors and was spearheaded on Thursday by a full day of sessions including recent developments in synthetic fibers and yarns and knitted fabrics.

Experts in the area of technology, marketing and merchandising discussed the most recent fiber and fabric developments before an all-time high audience from the knitwear, swimwear and allied industries. (Editor's Note: Full coverage of these talks is included in this week's issue of the KNITTED OUTERWEAR TIMES.)

A highlight of the yearly convention was the luncheon program at which Earl W. Kintner, chairman of the Federal Trade Commission, delivered the major talk on discriminatory advertising allowances and similar practices which have been described as unlawful under the Robinson-Patman Act and labeled unfair by a wide range of

(*Continued on Page* 45)

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NKOA Convention Proceedings

Review Of Industry Operations

By SIDNEY S. KORZENIK
Executive Director & Counsel
National Knitted Outerwear Association

THE industry in 1959 resumed its expansion. After the pause during 1958 at the peak levels previously attained, last year saw the industry move on to achieve new highs in several major areas. It is estimated that the value of shipments closely approached if it did not for the first time actually pass the $1 billion mark. Although it is necessary for this survey still to rely upon estimates, official census figures being lacking even at this late date, it is apparent from all available indications that the total production of sweaters in the United States has surpassed the previous total by close to a million dozen. This represents a giant step forward.

Most of this increase was contributed not by the major area of sweater production but in the manufacture of men's sweaters. It may be inferred from the facts in hand that men's sweater production increased by approximately 650,000 dozen in 1959, lifting the total domestic output of sweaters of this type to approximately 2.9 million dozen — an increase of nearly 30 percent, and a continuation of the rising consumer demand for this product.

It is likely that women's, juniors' and misses' sweater production rose by about nine percent. This percentage, applicable to a much larger segment of the industry, represented a gain of approximately 325,000 dozen, so far as one can presently judge.

Allowing smaller gains in boys' sweaters than in the case of men's, and somewhat less in infants' and children's sweaters that in women's, we estimate that the total production of pullovers and cardigans of all kinds in 1959 rose to approximately 14.8 million dozen, as compared with 13.8 in 1958, an over-all increase of about seven percent —not as sharp a rise as the industry enjoyed in 1955 (nearly 12 percent), nor in 1956 (approximately 17 percent), but nevertheless substantial by any standards.

Women's swimwear production scored a gain of approximately 10 percent, according to our present estimates, achieving a total of about 2,600,000 dozen garments in 1959, a rise of 230,000 dozen. Men's and boys' swim trunks were less affected and enjoyed only minor gains. Total output of swim suits of all kinds was probably about 3.8 million dozen.

Knitted shirt production responded to the rising tide of popularity of this article, and its total is estimated to have increased by more than five percent gains, here being again concentrated in the men's category. The total production of all kinds is probably approaching 21 million.

Product Diversity

Variety in styling and fiber types may have been a headache to production management in 1959 but again proved the catalyst for sales expansion. The industry's products have continued highly diversified in fiber composition. Now, at the threshold of the new season, when the industry is again grappling with the difficulties of yarn selection in the creation of a new line, it may be helpful to review last year's experience.

Orlon will no doubt continue to dominate in women's sweaters this year, as it did last. Out of a total of approximately 7,840,000 women's, misses' and juniors' sweaters produced in 1959, those made entirely of Orlon represented about 57 percent, about the same proportion as in the previous year, of the industry's rising total. Those made of texturized filament nylon yarns, of which Ban-Lon is chief, occupied about 11 percent of the total area. Wool claimed about 19 percent of the ladies' sweater field, its use in the popular bulky type having contributed to its improved position. The share accorded to blends of various fibers may have improved slightly.

In men's sweaters, wool now predominates. Its percentage of the field is probably a little better than 50 percent as compared with about 48 percent in 1958, and 45 percent in 1957. We refer here only to garments made wholly of wool. Gains in men's sweater production were also made in blends of wool and synthetics.

In women's swimwear, suits of knitted fabrics showed a greater proportionate increase than did any of the other types. Knitted suits are now estimated to have represented about 20 percent of the total in 1959, as compared with about 16 percent in the previous year. The woven elastic fabric still dominates the field, with roughly 50 percent of the national total of 1,300,000 dozen women's suits. The rest, a little less than 400,000 dozen, is of the woven rigid fabric type.

Although the knitted shirt field still overwhelmingly belongs to cotton, Orlon and texturized yarns have been making successful inroads, particularly in the full-fashioned category,

Signs of the Times

At this point, a few observations on recent developments deserve comment.

First: The vogue for the bulky sweater has stimulated increased consumption of wool yarns. Yet, it is interesting that the proportion of the total sweater production represented by wool, at least in women's sweaters, has remained relatively unchanged. Indeed, it will be observed that during the last four years, the relative proportion represented by each fiber category in the production of women's sweaters has remained by and large surprisingly stable. In 1955, the year of the fiber revolution in knitted outerwear when, for the first time, Orlon captured the place of primacy in women's sweaters with about 60 percent of the total, wool represented about 20 percent. It was again approximately 20 percent of the substantially larger total of 1959 and its propor-

(*Continued on Page 5*)

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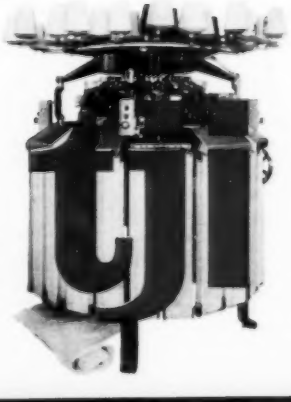

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tion was about the same during the intervening years. There have been no major shifts in fiber use in the past few years. This is no prediction for the future; it is merely a fact concerning the recent past.

Second: The great popularity enjoyed by men's sweaters has attracted a major shift in productive facilities to this field, demonstrating once again the remarkable flexibility of the industry. It is hard to estimate by how much the manufacturing facilities at work on men's sweaters may have increased by reason of the entry of women's and children's sweater producers into this area. But it seems to be appreciable. The shift that is described here recalls the one that occurred in the opposite direction when women's sweater prospects attracted producers of men's sweaters in the years between 1951 and 1954, while production of men's sweaters declined. Such movements are in character with the industry's historical development.

Third: So, too, is the trend of reawakened interest in links-knit products. For some years now, knitted outerwear of this type has been in eclipse. But its revival has been encouraged by the appeal of the "bulky" and by the capacity of the links machine to introduce new stitch diversity. Links knitting is, of course, among the most versatile in the art. So, once again, as has occurred numerous times in the industry's past, the tarpaulins are being removed from old links machines, and it is a likely guess that a number of them will be moved back into production within the coming season, if present signs prove reliable—not necessarily the old flat links whose slow production pace may no longer be gaited to today's needs, but the more rapid circular links.

Fourth: The fashion appeal of matching skirts and sweaters has sparked a lively interest on the part of skirt manufacturers in sweater production and some have entered the industry. This is parallel to the recent tendency of knitted outerwear manufacturers producing women's sweaters to undertake skirt production to meet the same demand for matching combinations.

Fifth: In the field of women's sportswear, there is a growing trend toward knitted suits, the jacket and skirt combinations not dissimilar from the type that represented a large area of production in the industry in the late Thirties. Much of it is of the plain cut-and-sewn variety. The present trend finds its inspiration largely in the superior qualities of the knitted outfit for travel.

Full-Fashion Production

Production of full-fashioned sweaters grew rapidly during the past decade, but the contribution which it made to the industry's production total was always a matter of conjecture and estimate. No classification of this kind ever appeared in the official government census. So to fill the gap, the Association has made the first comprehensive survey of this branch of the industry. The results offered here are preliminary and are subject to revision when our survey is completed.

Full-fashioned sweaters produced during the last four years represented an average of about 12 percent of the industry's total sweater output, with relatively little variation from year to year. In 1956 full-fashioned goods amounted to approximately 1.45 million, or 12.3 percent of the industry's unit volume; in 1957, it stood at 1.68 million dozen, or about 12.5 percent; in 1958, 1.64 million dozen, or approximately 11.8 percent; and in 1959, 1.97 million dozen, or a little better than 13 percent. This last figure, however, is subject to some qualification, as it may include the hybrid full-fashioned men's sweater-shirt.

These figures represent projected estimates for the industry as a whole on the basis of replies thus far received in our survey.

The Association's study covered the years 1955 through 1959. We know that in the early Fifties, there was a dramatically swift rise in the contribution of the full-fashioning machine to the industry's total. In 1955 there were about 3800 sections in place; by the close of 1956, 5200; at the end of 1957, nearly 5800. But there has been no significant increase since then, and the indications are that the rate of activity of even this equipment may have somewhat declined. Why, it must be asked, should this trend in favor of full-fashioned goods, which showed so much promise at first, have thus been arrested? Why was its promise of further growth aborted when the rest of the industry continued to expand? A large part of the answer, I thing, involves a consideration of foreign imports and their effects on domestic production.

TABLE I

Comparison Between Japanese Exports and Domestic Production of Full-Fashioned Sweaters Made Chiefly of Wool.

Year	U. S. Production	Japanese Exports to United States	Percentage of Japanese to U.S.
1955	273,296	63,772	23%
1956	514,050	261,534	51%
1957	632,976	224,612	31%
1958	623,073	242,151	38%
1959	750,000	294,408	39%

Knitgoods From Abroad

The Association's survey of full-fashioned goods makes possible for the first time a proper consideration of the place and effect of foreign imports upon the domestic market and the true proportions which such competition bears to the domestic counterpart.

It will be seen, in the light of data now available for the first time, that a comparison between the total volume of sweaters imported from Japan and the total sweaters of all kinds produced in the United States is likely to be misleading. This is so because sweaters of all types are not imported into the United States from Japan. Japanese knitted garments have been exclusively full-fashioned and almost entirely of wool or wool blends. To evaluate the place of such imports in the American market and their impact upon American producers, one should compare like with like—Japanese imports with the domestic product of the same character, i.e., full-fashioned and in chief value of wool.

Table I is a comparison between full-fashioned sweaters made entirely of wool or of wool blends (exclusive of cashmere) and Japanese sweaters in chief value of wool exported to the United States during each of the last five calendar years.

The figure offered as domestic production for 1959 is believed somewhat inflated, as pointed out above by the inclusion of men's knit shirts made on fashioning machines.

Were this figure adjusted to exclude sweater-shirts in order to preserve the comparison, it is believed that the proportion which Japanese sweater imports bore to comparable production in the United States would be higher than represented above. Moreover, most Japanese sweaters exported to the United States in the earlier year were probably entirely of wool, not blends; most of the domestic sweaters included in the comparison were of blends. If the comparison were further refined to contrast domestic production of full-fashioned sweaters entirely of wool with Japanese goods sent here, a more direct comparison, the results are as shown in Table II:

(*Continued on Page* 42)

TABLE II

Comparison Between Japanese Sweater Exports and Domestic Production of Full-Fashioned Sweaters Made Entirely of Wool

Year	U. S. Production	Japanese Exports to United States	Percentage of Japanese to U.S.
1955	115,007	63,772	55%
1956	106,630	261,534	245%
1957	122,421	224,612	183%
1958	105,267	242,151	230%
1959	150,065	294,408	196%

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NKOA Convention Proceedings

Growing Role Of Creslan Acrylic Fiber In Knitwear

By GEORGE P. VESCIO
Manager of Apparel Merchandising
Fibers Division, American Cyanamid Company

CYANAMID'S manufacturing plant for Creslan began commercial production just over a year ago. During 1959, much of the fiber which went into commercial programs was supplied by a pilot plant at Cyanamid's Research Laboratories in Stamford, Connecticut. In 1960, all the fiber is being supplied by our ultra-modern plant near Pensacola, Florida.

Creslan has made a broad penetration in men's wear since your last convention. While we were just getting started in 1959, the penetration this year is well underway in a multitude of end-use areas including sweater-shirts and knitted sport-shirts.

The picture in women's through infants' wear includes sweaters, knitted slacks, knitted suits, knitted dresses, knitted shirts. This type of penetration has been possible only because of the exceptional characteristics of Creslan, its ability to adapt well to many types of fabrics, constructions and looks, and the merchandising concepts behind Creslan.

Focusing now on the current role of Creslan in knitted outerwear, for the soaring 60's we have created a new group of knit fashion "looks," uniquely styled to fill fashion with functional needs within the growing style trend of lightweight knitwear.

First, the "luminescent look." The appearance of yarns featured in the luminescent look is made possible by the unique inner-glow of bright luster Creslan—plus its ability to absorb color with full penetration. The hand is distinctive; for ease of description, the term "silky" will characterize it to you. I might add at this point that our evidence indicates that the reason for this unique luster is the exceptional purity of the chemical mixture from which Creslan is extruded. The key factors in the consumer appeal of the luminescent look are its elegant appearance, its distinctive hand, its light weight and its drape. Complete washability is an automatic advantage when proper knitting and finishing procedures are employed.

Whereas the straight spun yarns give undiluted luster highlights for the luminescent look, variations in appearance for other new looks result by building a third dimension into the yarn. This may be accomplished, for example, by novelty twisting to achieve the pebble crepe knits and the coarser surface chenille knits, or by texturizing, to produce lofty, soft, high surface cover knits.

In 1960, new looks for spring and fall based on bright luster Creslan are being solidly established through five manufacturers. These manufacturers are among the quality listing of "Who's Who" of the industry. Sampling by manufacturers is in progress now for the holiday-spring 1961 seasons, with every indication that the penetration will continue at an increasing rate.

Here are samples of the current fashion achievements with these new looks. They include:

1. In the luminescent look, all 100 percent Creslan:

(A) A 30-gauge full-fashioned dress.

(B) A 21-gauge full-fashioned dress.

(C) A 12-cut rib-knit women's suit.

(D) A 36-gauge full-fashioned men's sweater-shirt.

(E) A fine-gauge chalk-dot men's cardigan shirt.

(F) An eight-cut links and links semi-bulky sweater in a cable stitch variation.

2. In the pebble crepe knits, all 70 percent Creslan with 30 percent nylon:

(A) Fine Italian rib knit slacks with draped collar sweater in a lace stitch.

(B) A 30-gauge full-fashioned dress.

(C) A 30-gauge full-fashioned women's sweater-shirt.

(D) A 21-gauge full-fashioned men's sweater-shirt.

(E) A lightweight women's sweater in a lace stitch.

(F) A one-size men's sleeveless sweater.

3. In the coarser surface chenille knits, 80 percent Creslan with 20 percent nylon:

(A) A 21 gauge full-fashioned dress.

Cyanamid's creative emphasis on new yarns is under the direction of one of the industry's outstanding designers, Maurice Levin, who recently joined our staff. Through our designer service, a strong liaison will be maintained with leading manufacturers in all segments of the industry.

Furthermore, we are backing up these ideas with knitting facilities and field consultation. To assist in this program, we have retained the services of Ted Bodin. These services include a complete knitting mill

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NKOA Convention Proceedings

Knitting With Acrilan 16

By JEROME B. EDELMAN
The Chemstrand Corporation

THOSE of you here today are familiar with the name Acrilan. On the other hand many of you are unfamiliar with the properties that are beginning to make it a staple yarn in the sweater market. We have two Acrilan yarns. One is called Acrilan and the other is Acrilan 16. Both are identical in nature except in their affinity for dyestuffs. Acrilan can be dyed with at least seven classes of dyestuffs by methods that are essentially conventional. Acrilan 16 has been designed with dispersed and improved basic dyeability. Unlike Acrilan, Acrilan 16 has no affinity for acid, chrome, neutral, premetalized, or other wool-type dyes.

These unique differences in dyeing characteristics in Chemstrand's acrylic fiber whose physical properties and processability are otherwise so very similar, make Acrilan and Acrilan 16 ideal for use in combination. By the proper selection of dyestuffs and dyeing conditions an almost limitless range of attractive two-toned patterned effects can be developed, or alternatively, one component may be dyed and the other left undyed giving us a frosted effect. The number of styles which can be developed in two-tone solid colors or heather effects is limited only by the skill and ingenuity of the spinner and knitter. With all the varying colors that are achieved, I must stress one point. There are no fibers other than Chemstrand's acrylic that have been introduced into the yarn. It's all 100 percent Acrilan and is so labeled.

The type yarns that are in use this season are as follows: 100 percent Acrilan; 100 percent Acrilan 16; 65 percent Acrilan and 35 percent Acrilan 16; 35 percent Acrilan and 65 percent Acrilan 16; 50 percent Acrilan and 50 percent Acrilan 16; 80 percent Acrilan and 20 percent Acrilan 16; 90 percent Acrilan and 10 percent Acrilan 16.

Yarn sizes that are most popular range from 1/34s to 2/12s worsted counts. The techniques used in knitting and dyeing are not only practical but have many other advantages. But first let's look at the sweaters.

The first one I have is a piece-dyed bulky, knit on a four gauge circular machine. It's a blend of 65 percent Acrilan and 35 percent Acrilan 16. It is a lovatt color achieved by the blending of a number of dyestuff colors.

The second is a brushed sweater knit on a six cut circular machine of 65 percent Acrilan and 35 percent Acrilan 16. Here the 65 percent Acrilan was dyed and the 35 percent was left undyed, giving us this frosted appearance.

The next one is a napped and sheared sweater also a 65/35 mixture. It's a superior garment in hand, washability and its resistance to pilling.

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YES, CARON HAS

"Orlon"® Sayelle"

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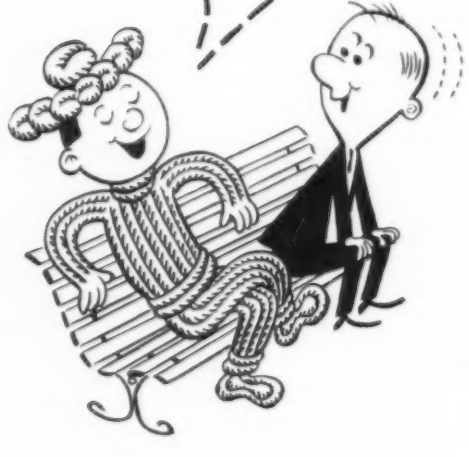

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NKOA Convention Proceedings

New Style Trends In Knitwear Of Synthetic Fibers

By DONALD F. POLLOCK
Textile Fibers Department, Du Pont Co.

INCLUDED in my definition of new style trends in Du Pont fibers are different concepts, different viewpoints, and, very importantly, different applications. In short, it involves all things associated with or related to creativeness and ingenuity. With the help of illustrative material to pinpoint specific points and details, I'm going to tell you about some of the things we have in mind that fit the definition that we have set forth.

First of all, we want to talk about the knit jacket for men. Now as far as jackets go, this is something new. When analyzed, however, it is a different application — a matter of utilizing sweater machinery or jersey equipment to produce fabric for an item that is not really a sweater or a sport shirt.

The knit jacket is the cardigan coat-sweater going outdoors. It is a natural outgrowth of the popularity of the cardigan plus bulkier Orlon acrylic yarns and, of course, more widespread availability of coarser gauge knitting machinery. It features bold masculine styles, pattern, texture, and color interest.

Other Ingredients

The knit jacket is being and will be widely interpreted, with and without interlinings, and in some instances will take advantage of other new materials such as batts of Dacron polyester fiberfill, pile linings of Orlon acrylic fiber, and fleeces of Antron trilobal multifilament nylon. Garments of this description are off to a good start for fall 1960, and we foresee a healthy growth for them via the routes of 100 percent Orlon and the blend of 80 percent Orlon and 20 percent wool.

The next item is men's and boys' knit shirts of 80 percent Orlon and 20 percent either wool or cotton. This is an area where big advances in styling are occurring—but one where there is room for additional creative abilities from competent imaginative people such as you. This is fast becoming a high-fashion type of business, and among the interesting variations we see are the shaggy look with a terry-type appearance, the alpaca-like fabrics, and various Italian-inspired knit constructions.

Checks and plaids are joining the growing range of stripes which are in such strong demand by the garment manufacturers. Three or more color effects which produce what are sometimes known as "mist" colors are available through the use of color-sealed Orlon and regular Orlon in combination with wool.

Vent-Knit Fabrics

In the area of 80 percent Orlon and 20 percent cotton, the standard jersey stitch is rapidly being expanded so that the fabric base includes bird's eye, crepe, mesh, and other open-type ventilated-looking fabrics. This blend alone insures excellent body comfort to the wearer, but when that innate comfort is combined with a cool-looking stitch, it is bound to capture both the fancy and the pocketbook of the consumer. Seems like a natural way to open up the spring-summer market, doesn't it?

Still another development of expanding interest is the blending of 80 percent Orlon acrylic fiber with 20 percent mohair to produce interesting boucle effects, exciting color contrasts and combinations, outstanding styling opportunities, and, in general, exciting-looking fashion merchandise.

Women's Sweaters

Among the interesting variations of concept are two items: one in women's sweaters and the other in the men's. They are respectively the Tote sweater and the Interim Knit. The Tote sweater is a lightweight garment designed for use in spring and summer and also designed to increase retail sweater sales for the spring season. The Tote sweater in 100 percent Orlon represents the perfect summer travel companion for those many occasions where ideal air-conditioned comfort is welcome, such as outdoor evenings, summer cruises, sporting activities, air-conditioned theaters and restaurants. The Interim Knit also has the purpose of increasing retail sweater sales in the spring retail season. To accomplish this, we have even eliminated the word "sweater" from the description. As the name implies, it is an interim type of garment which is intended to become a favorite for such activities as tennis, golf, yachting, campus, and suburban wear.

The Interim Knit features an open, cool-looking construction and the use of a pure white body which is so ideally obtainable from Orlon acrylic fiber. It is truly a year-around lightweight

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NKOA Convention Proceedings

New Techniques In Marketing Orlon Fiber

By GEORGE B. LEWIS
Textile Fibers Dept., Du Pont Co.

THE subject of my talk is a real challenge because it is such a broad one. Rather than try to cover all of the Du Pont fibers that are used by the knitted outerwear industry and rather than try to discuss all the end products which comprise knitted outerwear, I will limit my remarks to sweaters and to Orlon acrylic fiber.

The main thing we are trying to do is to broaden the market for sweaters. We do this by creating as much excitement as possible about sweaters as a fashion item. For instance, by showing the number of ways the basic pullover or cardigan can be worn or accessorized to create fashion excitement.

Concept selling such as this is something that we have been doing for a number of years. I am sure some of you will remember the ad that ran five years ago kicking off our consumer program on "The Sweatered Look in Orlon." Since that first campaign, which I am sure was helpful in broadening the retailers' and consumers' view as to the suitability of sweaters for all times and occasions, we have introduced a number of new concepts that were aiming at the same objective.

Last fall in the men's wear field, we supported "Sweatermanship with Orlon" or "The Art of Looking Great in Sweaters Without Half Trying." Also, last fall in the women's field the selling idea was roughly the same but the words and art approach were somewhat different. We underscored "The Sweater Adventure" that was possible in Orlon acrylic fiber. Another example of our effort to broaden the market for sweaters is our campaign in the women's and children's wear field this spring which dramatizes to millions of people a new sweater idea in Orlon, namely, the Tote Sweater. The effort here is to capitalize on the opportunity for your industry which has been brought about by air conditioning, by outdoor living and by the range of activities that one may undertake in a 24-hour period at today's accelerated living pace. "Tote a sweater to be in comfort—to be in style."

Our program, of course, is not limited to advertising. Our publicity effort is the largest in the textile industry, and much of it is devoted to sweaters. Since fresh ideas are the core of news appeal, our publicity staff expends a great deal of time searching out news - worthy, trend - setting garments and searching out new ways to present them to the editorial community. The "Bed Sweater" is another excellent example of how knitted outerwear, and especially that of Orlon acrylic fiber, fits into our daily lives—24 hours a day, awake or asleep.

(*Continued on Page* 41)

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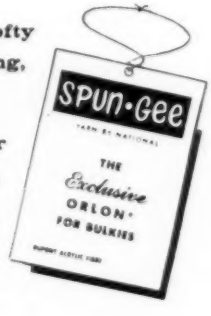

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NKOA Convention Proceedings

Du Pont's New Fiber Developments For Knitting

By COLLINS THOMPSON
Textile Fibers Dept., Du Pont Co.

THE Du Pont textile fibers organization thinks of the knitting industry as a major style-based business accustomed to supplies of a great variety of fibers. The first and basic phase of our overall creative selling effort is new fiber research. Fiber characteristics and differences are at the heart of the styling, the aesthetics, and in some cases the functionality of the knit goods you produce. There are wool effects, mohairs, cashmeres, angoras, and, of course, effects of Orlon acrylic fiber. All of these fiber patterns have been and probably will continue to be important business-wise.

In view of these requirements, Du Pont has had for a number of years a special research program to evolve a more comprehensive family of knitting fibers for basic style use. A number of results to date you already know, including:

- Orlon Cantrece acrylic filament
- Orlon Sayelle bi-component acrylic fiber.
- Antron trilobal multifilament nylon
- Lycra spandex fiber

The momentum of the technical program is such that a continued flow of new style fibers for knitting appears assured.

In practice, just how does this research program work, and how does it evolve products for chosen goals? To show this, I'd like to describe a couple of examples where successful efforts have evolved.

Let's look first at Orlon Sayelle bi-component acrylic fiber. This new product, as many know, was introduced last year for styled sweaters and hand knitting yarns. In these end-uses, Orlon Sayelle exemplifies creation of a new basic fiber type, giving the knitting industry a means of making a substantial range of knit effects not previously possible with regular Orlon or with other man-made fibers. In this case, the new fiber property determining the effects is crimp—a permanent reversible "corkscrew" crimp very similar in behavior to that of animal fibers.

Let's look at a few slides which clarify the nature of the technical work done. Fortunately, successful technical developments often can be described more briefly than the dozens of research steps that produced them. The development of Orlon Sayelle is such a case.

The first slide shows a segment of a theoretical fiber. This is not a conventional fiber, but a two-component structure with the components fused together along their contact face in spinning. Now if the fused components differed somewhat in molecular make-up, their response to external conditions could be different. If we chose for this segment, for example, two polymers that swelled to different degrees in heat and moisture, this little segment could be made to bend from its original straight shape to a curved state just as a bi-metal element for a thermostat does when the surrounding temperature changes.

By fitting the two polymers selected to the general range of available hot, wet conditions in textile finishing, a curve of about the same degree found in the crimp waves of individual animal fibers could be developed. This reversible deformation, due to swelling differences between components of bi-lateral fibers, has been determined carefully as the exact crimping mechanism of a number of important natural fibers. This differential behavior is the rather simple theory underlying the product as actually developed, Orlon Sayelle acrylic fiber.

To go a step ahead from theory to practice, let's bring on the next slide. Here we see not a segment but lengths of three model fibers shown schematically. One component in both the model of Orlon Sayelle and the animal fiber control is stained while the second component is left clear. The model of Orlon Type 42—being just a single element—is all one color. In both the two bi-lateral fibers, notice a harder or stiffer member runs to the outside of each individual crimp elbow, while the deswelled member shrinks to the inside, thereby pulling crimp into the fiber. This configuration is the equilibrium actually reached by Orlon Sayelle fibers in drying following wet finishing.

The nature of the interface continuity or "weed" in these fibers shows up in this cross-section enlargement. The stained segment is the more highly swellable of the two fiber-forming polymers involved. There is,

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NKOA Convention Proceedings

Improved Du Pont Fibers For Knitting

By JOHN C. HOSHEIT
Textile Fibers Department, Du Pont Co.

AN important area of Du Pont's activity is concerned with a program for continued improvement of our existing product lines for your industry. In our manufacturing organizations those individuals who work on control of product quality, all the way from raw material through finished staples and tow, constitute the largest single group of operating personnel at plant locations.

This group, together with our technical service organization of well over 100 technically trained representatives, is constantly reappraising the needs of your industry in terms of improved products. The technical service group, whose members function as guardians of our product quality also serve as technical liaison between the manufacturing organizations of Du Pont and you, the knitted outerwear industry. Today, I would like to discuss two areas of vital interest to the knitting industry. These are product improvements in both Orlon acrylic fiber and Du Pont nylon.

Over the years, the performance of Orlon staple and tow has been improved step by step to keep pace with the increasing quality and volume demands of the knitting industry. During the past year, we have taken the latest step in basic improvement of the processing performance of Orlon staple and tow. The merge change which was successfully executed at the end of last season incorporates an impressive list of product advancements. Now, we have taken another step forward in base fiber whiteness. This recent advance is the latest of a series of such steps which began some time prior to 1956 when a whiter, more dyeable product was introduced.

As a part of this recent merge change, we announced an improved high shrinkage staple product, with an increased level of anti-static protection. This is expected to result in significant improvement in the quality of high bulk yarns of Orlon acrylic fiber spun on the cotton system. Better control of static during processing means better blend uniformity, better processing uniformity generally, lower waste, and more uniform quality high bulk yarns.

The introduction of a very low shrinkage staple along with the improved high shrinkage staple product is expected to contribute still further to the production of improved cotton system high bulk yarns of Orlon having more uniformity and higher bulk.

For spinners of yarns from bright Orlon staple, we are now offering an improved product with a significant increase in mass cohesion and protection against static in processing. It is expected that this product will enable the spinner to produce

(*Continued on Page* 38)

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NEOA Convention Proceedings

Vyrene Thread And Its Place In The Elastic Fabric Industry

By K. J. RUPPRECHT
Development Manager, Lastex Division
United States Rubber Company

VYRENE is the registered trademark of U. S. Rubber Company for its new synthetic elastomer classified under the generic name Spandex. It is a manufactured fiber composed of a linear polyurethane. It is a reaction product from materials that originate in the petro-chemical industry. The chemistry of Vyrene differs basically from that of rubber. Most of the compounding ingredients commonly used in rubber are not required in the manufacture of Vyrene. Physical characteristics may be altered through process control.

The need for another elastomer may be developed by reviewing briefly the history of the elastic industry. Prior to 1930, most rubber thread was restricted to coarse counts and used in relatively heavy fabric. The rubber thread had only functional value. Examples would include the heavy underwear webbing and suspenders common to the 1920 era.

During the early thirties, two developments broadened the elastic industry. First, rubber thread extruded from latex made available large quantities of relatively fine thread at economic price levels. Secondly, fine covered thread in the form of Lastex provided a material that could be incorporated directly into practically all types of fabric. This new elastic yarn also contributed to the texture or appearance of fabric as well as providing for the function of stretch.

By the 1940's elastic fabrics were manufactured on a great variety of equipment including circular knit, flat bed, lace and net, and looms. During the last decade there has been an increasing interest in sheer elastic fabrics. A high proportion of our current Lastex production is made from cores measuring 1/100 of an inch in diameter.

During these last thirty years, great strides have been made in the compounding of rubber to meet thread requirements. The present product in the current popular range of sizes is entirely satisfactory. For large-scale use in such applications as swim suits for example.

Let us next examine the problems confronting a rubber compounder when we demand thread at, say 1/200th of an inch in diameter. This would really make it tough. In the first place, rubber is subject to oxidation which progresses inward from the surface. Deterioration may be accelerated from ozone, light or fumes. The surface penetration would soon have a significant effect because of the small volume of rubber as related to the large area exposed. Rubber has a high coefficient of friction and has a tendency to develop tears, an action commonly called "chafing." Here again, any small tear would carry quickly through the thread. For extremely fine sizes, therefore, rubber thread has serious limitations.

Another deficiency common to rubber goods is the action of solvents such as encountered in dry-cleaning. These solvents tend to remove the protective agents so that deterioration becomes accelerated.

How Vyrene Fits In

Vyrene thread is not subject to oxidation in the same manner as rubber thread. It, therefore, has excellent shelf-aging properties without serious limitation as regards thread size. Vyrene also has high chafe-resistance so that the two essential requirements for fine thread are met.

In addition, our tests indicate that Vyrene thread has reasonable tolerance for dry-cleaning solvents so that, here again, an opportunity exists to broaden the market.

In designing a new elastomer for the textile market, the existing rubber technology may be used as a yardstick. If you will refer to the chart, we can draw some comparisons of essential characteristics. You will note that the tensile of Vyrene thread is substantially higher than rubber thread. Good rubber thread generally runs around 6,000 pounds per square inch, whereas Vyrene will run in the order of eight to 10,000 pounds. This provides an advantage, although in most fabrication, rigid materials are incorporated to provide an end, or breaking, point. However, it is a good "plus" value.

You will also note that the modulus of the material is high and comparable in characteristics to rubber. I might point out at this time that the stretch shown (600 percent) was selected to compare favorably with the stretch level common in the rubber thread industry. This property could be altered through process control, but the industry as a whole has acquired a great deal of experience with elastomers at this value. Vyrene should, therefore, work in well with existing "know-how."

You will also note that the permanent set shows a figure of 10 percent. Here again, the comparison with rubber thread is favorable. Rubber thread generally runs 10 to 15 percent.

No figure has been shown as a measure of chafe-resistance. We have devised tests for rubber thread in this respect, but have some trouble correlating with actual machine performance. However, the high chafe-resistance of Vyrene is easily discernible by merely rubbing the fingers over the stretched elastomer and then running the same test on rubber thread.

Problems Cited

Like most new materials, Vyrene thread at the present state of development has some deficiencies. The current product tends to be flat or oval and uneven in cross-section along the length. Rubber thread can be made substantially rounder in cross-section. We are well aware of this deficiency and recognize some of the limitations that result. In most fabrication, including knitting, weaving, etc., this unevenness is completely randomized and lost to visual detection. However, in some very sheer open stitch knitting, a certain amount of roughness will be imparted to the appearance of the fabric and this is a problem that we must overcome.

Vyrene thread is heat-sensitive. Fabric finishing can be carried out successfully at wet temperatures up to 180 degrees F., but trouble may be encountered with temperatures of 200 degrees or over. This does, however, involve a time factor.

Vyrene is receptive to certain types of dyes, and I must confess that our customers and, especially some finishers, are more advanced in this technology than we are. With some dyestuffs, the pick-up is rather heavy so that it is not always easy to get a uniform blend with companion textile fibers.

Serviceability

Garments made from Vyrene thread stand up well in service. A test we commonly use consists of the following series:

1. One week wear test.
2. Ten commercial laundry and dry cycles.
3. One week wear service.
4. Ten laundry and dry cycles.
5. One week wear.

By distributing garments, a variety of home laundry treatments is provided, and by using two different commercial laundries, we further broaden the test. Performance has been satisfactory with this test employed for such articles as swim suits, girdles, bras and hose.

In dry-cleaning, we have found that physical properties remain at a satisfactory level after seven cycles. Of course, much more work is in progress on all forms of wear-testing.

Vyrene thread, suitably covered, has been manufactured into a great variety of ultra-fine fabrics. These include sheer tricot, circular knit and full-fashion knit. Garments of this type have good "kick" which is provided by the high modulus of the Vyrene and also by the large number of ends available to do the work.

Fine woven swim suit fabrics have been produced in volume from ultra-sheer yarns and finished out as prints. We believe there is a definite luxury market that can be filled by Vyrene

(*Continued on Page* 39)

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NKOA Convention Proceedings

New Developments In Textralized Yarn For Ban-Lon Knits

By HARRIS L. JOHNSON
Joseph Bancroft & Sons Co.

MODIFIED continuous filament garments and fabrics as of today are radically different than those we knew during the past few years. Today, design, color, texture and hand are so vastly changed that we must look at these fabrics as an entirely new program with many additional attractions to the consumer.

What do these modified yarns offer to you? Have you, the manufacturer, exploited the possibilities of the uses of modified continuous filament yarns? Let us examine the potentials and developments of one type of modified yarn.

Textralized yarn used in the manufacture of Ban-Lon garments and fabrics, because of its unique bulking properties resulting from the thousands and thousands of crimps, allows you to form fabrics that will be light in weight yet bulky in hand. This yarn produces a clear stitch definition which can be utilized in many ways.

Textralized yarn also produces patterns or designs in fabrics that are literally three-dimensional. There are no top surface fibers protruding to hide these patterns. This is the first time that pattern machines can be utilized to the fullest extent to give the garment high fashion texture.

What you have just seen was the beginning of our program. We realized that this was only part of the answer. You, the manufacturer, needed a yarn that was completely versatile to allow you to produce fabrics and/or garments which were really high fashioned and high designed. The yarn must be available for ingrain knitting and yet give you the maximum bulk level to retain the original natural characteristics.

An extensive staff was given the project to develop a machine that could produce yarn which would be satisfactory for package dyeing and still retain the maximum bulk level. Our newest technical achievement for this program is what is now commonly known as the core crimper.

One of the most important advantages of the core crimper lies in the method of operation that makes package-dyed yarns of the extensive type available for the first time in the industry. Up to now, modified continuous filament yarns were either skein dyed or muff dyed. Package dyeing is much more efficient than either of the aforementioned methods. However, dyed package yarns previously were impractical to produce because of the extremely high loss of bulk in the yarn which resultd from this method of dyeing. The core crimper eliminates this problem and produces yarn which has maximum bulk, excellent uniformity, and spectacular clarity and depth of shade.

On the screen you see two thousand-meter skeins of 70 denier 34 filament Textralized nylon. The natural skein is from our standard crimper; the orange-color one is from the new core crimper. Here you will notice that maximum bulk is retained in the dyed yarn. The use of dyed yarns opens a vast new potential to you, the manufacturer. It enables you to use the versatility of your knitting machinery such as jacquards, links and links, or any other pattern machine. Ingrain knitting allows you, the manufacturer, to utilize the fullest skill of your designing staff. We have prepared a few slides to illustrate some potential possibilities of the core crimped dyed yarns.

Here is a fabric that was made on a seven-out Wildman Jacquard machine of 3/200/68 filament bright Textralized nylon. In this fabric, notice the utilization of single needle stitches and the clarity of the design because of the absence of top surface fibers. This fabric, as all dyed fabrics produced from core crimped yarns, has much more bounce or comeback which eliminates undue sagging at the elbows or places of stress.

This fabric was made on an eight-cut links and links machine. Both the dark brown and gold colors are made of 4/200/68 filament bright Textralized nylon yarn. This fabric is an example of what I have mentioned previously regarding the three-dimensional effect. The pattern literally stands out. This can only be done to this degree by using a modified continuous filament yarn such as Textralized yarn.

This cloth was made on a 14½-cut Wildman Jacquard machine of 3/70/34 filament semi-dull Textralized nylon. This fabric shows the intricate designs that can be used while knitting a continuous modified filament such as Textralized nylon. The single definition of this pattern is very outstanding.

So far we have discussed the coarse cut machines but not interlock. The fabric in this slide will show you what the use of dyed yarns will do when set on different feeds in a 16½-cut, 12-foot Wildman Jacquard machine. The colors of brown, tan, and light blue were used in that order completely around the 12 feeds of the machine. The effect is distinct and novel.

This fabric was made on a 14½-cut Wildman Jacquard machine utilizing 3/70/34 filament Textralized Dacron, 3/70/34 filament Textralized dope-dyed black nylon, and 3/70/34 filament natural Textralized nylon. The yarns in this fabric are all core crimped yarns and piece dyed to give you the color combination.

Horon is a fabric made on a four-cut Universal machine made from a rack stitch, needle cut pattern utilizing core crimped Textralized yarns of two ends of 3/200/34 bright nylon and one end of 2/200/34 bright nylon. This can either be made with ingrain yarns or dyed yarns, or made from natural yarns and piece dyed.

The slides you have just seen were all ingrain knit. Ingrain knitting could possibly solve many of your piece dye problems. You, the knitter, have complete control of production from yarn to garment without the fabric leaving your plant. It allows you to knit to specified orders, consequently keeping your inventory to a minimum and giving you a constant stock turn-over. The core crimper enables you to style with colors that heretofore have been impractical because of the extremely difficult dye problems involved. The range of colors now are without limitation.

Many of the Textralized yarns were made from heavy deniers utilizing 3, 4, and 6 deniers per filament. By varying the denier per filament, it is possible drastically to change the hand of the fabric. This can be from a soft cashmere hand to that of the coarsest wool-like hand that is known.

It is impossible to illustrate this to you. So we invite you to contact us so that we may show you these experimental knits that we have accumulated over the past eight months. A few of these fabrics have been sent to you as a Fashion Forecast mailing but there are many more fabrications which may aid you in the designing of your future fabrics.

Presently, our Ban-Lon research group is crimping a variety of new yarns. For example, the trilobal yarns which are being sold by Chemstrand and DuPont. This is a modified cross section yarn which has a new dry, pleasing hand with a built-in luster effect. The Textralized trilobal yarns which we have experimentally produced definitely enhance the selection of yarns available to you, the manufacturer.

What you have seen here today is a very small segment of our research activity. We have a continually expanding program pointed at an ever increasing range of new yarns and textures.

During the fall of 1960, the Ban-Lon trademark will cover the apparel field very thoroughly. These all will not be of the knit variety which we have discussed today. Garments will be made from fabrics which are woven, warp knit, and tricot. Thus, you can see the continual growth of the modified continuous filament market.

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FUR BLEND piece or skein dyed SWEATERS

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You get real "match mates" when you have Nicetown dye your fur blends. Nicetown colors in both skein dyed and piece dyed fur blends are consistent from dye lot to dye lot.

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You will find, as have many other manufacturers, that Nicetown's years of experience in dyeing fur blends and half a century's work in dyeing cashmeres, angoras, and wool pays off for you.

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NKOA Convention Proceedings

Paper Yarns And Their Use In The Knitting Industry

By VICTOR J. LOMBARDI
Product Development, Scott & Williams, Inc.

GIANT strides in all segments of the textile and allied industries during the preceding decade have provided a solid foundation for even greater achievements in the years ahead. The textile industry is facing a period of dynamic growth. We are entering into an era of unprecedented development and progress.

In no phase of the overall textile scene is this picture more clearly etched than in the knitting industry. The researching of new materials, the pioneering of new products, the engineering of new machines and techniques, and the developing of enlightened and farsighted attitudes on the part of knitting executives augur well for the future.

Surely, one of the most practical and exciting of these new concepts involves paper yarns and their use in knitted fabrics. With a per capita consumption in the United States of approximately 435 pounds annually, there is certainly no scarcity of paper. In fact its abundance imparts to paper its real value as an inexpensive and readily available material.

Numerous Applications

Couple with these its utility and we have a preeminently suitable material for the knitting industry. When converted into paper yarn and subsequently knitted into fabric, these plus factors give promise of spectacular applications in many broad areas. These include the apparel field, home furnishings, the automotive trade, rugs and carpets, cotton and wool baling, in plastic reinforcement, in vinyl backing, and numerous others. Wherever fabrics are used, there is, or will be in time, striking applications for paper knit constructions.

For example, their feature of moldability is now creating considerable interest especially in the automotive field, where the cutting and piecing-together of fabrics for seat covers, headliners, sidewalls, and carpeting involve costly hand operations. The prospect of molding fabrics for seat covers, headliners, sidewalls, and carpeting involve costly hand operations. The prospect of molding fabrics to specific shapes and joining these by some means of sealing—heat or otherwise—is exciting even when examined alone; when viewed in the light of the inexpensive knits, this concept takes on added appeal.

Apparel Uses

In the apparel field, sports jackets, shirts, undergarments, and a multitude of allied applications are definite possibilities. These are items designed to stand up under the rigors of washing and dry cleaning. They are not the "one-shot" disposables, although I would not discount an application for paper knit fabrics in this field. One of the major stumbling blocks in this regard at the present time is the labor costs involved in cutting and sewing.

In the carpet industry, the use of a knitted paper scrim for a carpet backing to replace the woven scrim presently in vogue is being given careful consideration. The requirement for a 15 foot fabric width poses a challenge to the manufacturers of knitting equipment.

As a replacement for burlap in the baling of cotton and wool, paper knit constructions have strong appeal. In cotton alone, more than 14,000,000 bales annually are involved. A paper fabric is clean, unlike burlap, where loose fibers contaminate the bale and necessitate additional steps in the process of yarn manufacture.

The success of the vinyls certainly needs no mention at this time. It suffices to say that the inexpensive knitted paper fabrics would serve admirably in this application.

Not New Idea

Paper yarns and methods to produce them are not new. Their history in the patent art extends over many decades. Substantial amounts of these yarns are now being used in the weaving trade for carpeting, decorative fabrics, as scrim for backing rugs, and for other end uses. Paper yarns have responded well to the process of weaving, which makes no especial demands on the yarn. However, in knitting, the stiff, unyielding nature of paper yarns was troublesome, especially in those constructions where it was formed into knitted loops, rather than being caught into the fabric on a non-knit basis.

Early attempts to knit paper yarn have involved steps to soften it, to make it more pliable, and in general to render it more receptive to the rigorous demands of knitting. Conditioning of the yarn prior to its use, or providing some means of moistening it before introducing it into the needles represented at best expedients which did not get at the heart of the problem. An appreciation of these difficulties—and I might add, parenthetically, an awareness of the wide potential for knitted paper fabrics—sparked a concentrated effort to engineer paper yarns with characteristics needed for trouble-free knitting. These efforts have been productive.

A paper yarn is produced by taking a continuous narrow ribbon of paper, moistening it by suitable means, and then introducing this moistened ribbon to a conventional type twister to impart the required number of turns per inch. The weight of paper from which the ribbon was made and the width of this ribbon are the two primary factors governing the yarn size. Paper weight merely refers to the weight of 500 sheets of 24-inch by 36-inch dimension. For example, therefore, a 20 lb. paper simply means that 500 sheets of 24-inch by 36-inch dimension weighs 20 lbs. The size of paper yarn is computed on the jute system, i.e., 14,400 yards to the pound representing a No. 1 yarn. The lightest paper yarn commercially available at the present time is a No. 5. This yarn has 2,880 yards to the pound and is roughly equivalent to a 3.4's cotton count. Since yarn size is mainly a function of the basic paper weight and the width of ribbon from which it is produced, different size yarns are producible by varying one or both of these factors, other things being equal. Accordingly, attempts to decrease the yarn size has prompted the use of lighter basic weight papers, alone or in combination with narrower ribbon widths.

In recalling the point made earlier that a paper yarn is produced by moistening a narrow ribbon and twisting it, I should like to elaborate more fully on two techniques currently employed in the manufacture of paper yarns. In one method, a roll of paper, usually a kraft paper with good wet strength characteristics, of convenient width and diameter (50-inch wide by 24-inch diameter represents a suitable size) is slit in a single operation into a series of individual wafers or pancakes, as they are frequently called.

This is accomplished by unrolling the paper and guiding the sheet through a bank of circular knives. These slit the paper into ribbons approximately 3/16-inch or wider. In a continuous flow, these ribbons are then wound side by side to make up the individual wafers. For purpose of illustration: if we had started with, say, a roll 50-inch wide by 24-inch diameter and were slitting to a ½-inch ribbon, we would end up with 100 individual wafers, each of ½-inch width by 24-inch diameter. If you imagine a streamer of exceptionally large diameter, you will get a picture of what a wafer resembles. These individual wafers are then mounted on individual twisting heads of a multi-spindle twister. Each ribbon, in proceeding from its respective wafer, is guided over an emulsion roller prior to entry into the twisting head. Here the proper twist is inserted in the ribbon, converting it into paper yarn on the bobbin. In a vertical operation, these bobbins can be taken from the twister and mounted directly on the knitting machine, thus eliminating a back winding operation.

With the wafer method of manufacture, a limitation exists from the standpoint of minimum

(*Continued on Page* 34)

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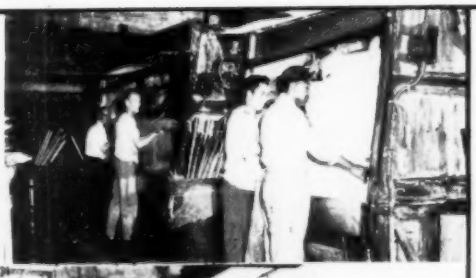

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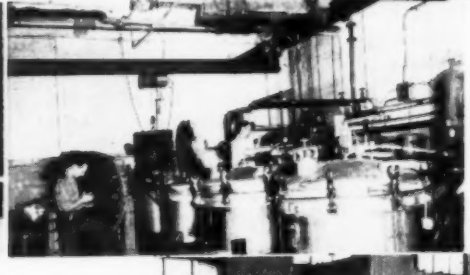

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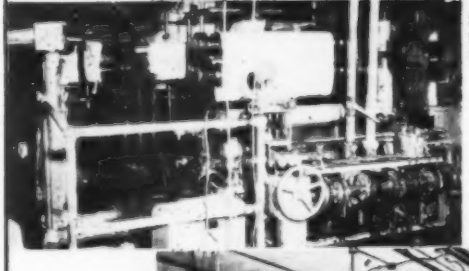

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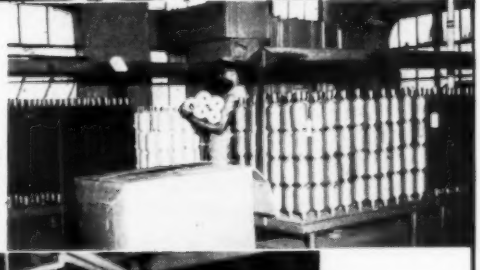

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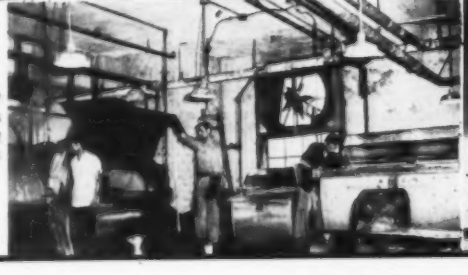

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NKOA Convention Proceedings

Aspects Of Resin Finishing Of Tubular Knitted Yardgoods

By HERMAN B. GOLDSTEIN
Plant Manager and Technical Director
Warwick Chemical Division, Sun Chemical Corporation

FOR more than five years, the phrase "wash and wear" textiles has been exploited to the hilt. Much of the present success of the new synthetic fibers can be directly attributed to the easy care properties of garments made from them. And the woven cotton industry, seeing many of their established markets slipping away from them because of this factor, soon turned to the use of resins for imparting wash-wear properties to cotton. In one form or another, the wash-wear phenomenon can be said to be the largest sales stimulant that the textile industry has seen in many years. With the trend to suburban living, and the shift to the use of casual clothing, the merchandising and promotion of wash-wear clothing has stopped the downward trend of textile's share of the consumer's dollar.

For a moment, let us dwell on this subject of wash and wear to see what it means to the consumer. First of all, "wash and wear" means that a garment can be laundered and then, after drying, worn with little or no ironing. Preferably, the laundering and drying should be done in a normal manner, to which the housewife is accustomed for the type of garment being handled.

Second, and of equal importance, when the garment is being worn, it should remain neat and presentable throughout the day: it should not wrinkle appreciably, nor should it become baggy or lose its shape.

Finally, the wash-wear garment should give approximately the normal service life to which the housewife is accustomed. The fabric should not soil unduly. The lightfastness of any dyes present should be adequate. And if the nature of the garment is such that it would normally be laundered with bleach, then the fabric should not be adversely affected by bleach. In the segment of the textile industry devoted to woven fabric constructions, great strides have been made in designing fabrics and developing finishes so as to provide the consumer with this highly cherished wash-wear effect.

If I may, I would like to turn now to the specific subject of knitted structures. In many of the classical end-uses of knitted fabrics, such as underwear, jerseys, sweaters, and so forth, advantage has been taken of the relative smooth drying properties of the knitted construction. In effect, the knitgoods industry has had, for many years, a sort of built-in wash and wear.

If this is so, the question naturally arises: why wasn't this property further exploited by extending the range of garment types using knitted fabrics?

To some extent, this was done with certain types of fibers such as wool and silk which the housewife considers delicate, and which could be expected to be laundered carefully by hand or even dry cleaned. More recently, the introduction of the new synthetic fibers which are dimensionally stable, have also helped to broaden the use of knitted fabrics. However, when we consider fabrics made from cotton, rayon, or blends with them, we run into some serious problems.

Actually, the processing of fabrics knitted from synthetic fibers, also present serious problems, but for the most part, the problems are different from those encountered with the cellulosic fibers. For instance, in the processing and merchandising of synthetics, we encountered problems with static, soiling and pilling. Also, a variety of finishing effects are desirable and attainable on synthetics. For example, through the use of Norane 1 and 2, it is possible to produce fabrics with stain resistance, with fuller and bulkier hand and with durable softened effects.

I am sorry that I cannot go further into the finishing of synthetics, but because of the lack of time, I shall have to limit the balance of this discussion to the problems associated with the processing and finishing of fabrics knitted with cellulose fibers or blends of these with synthetics.

If we study the geometry and stress-strain properties of the knitted fabric structure, it becomes very obvious that the fabrics are extremely dimensionally unstable. They shrink badly during laundering, and then when the shrunken garment is worn, it may stretch considerably and become baggy. Such performance might be tolerated in certain types of garments, such as men's undershirts, but would generally be unacceptable in any garments requiring fit, such as dresses, jackets, and shirts.

Fortunately, by the proper application of suitable chemicals, dimensional stability of knitted fabrics can be dramatically improved so that the garments will neither shrink excessively during laundering nor stretch excessively during wear. Simultaneously, these same chemical treatments further improve the smooth drying properties of the cloth, and provide rapid drying characteristics. Also, by the addition of certain other chemicals, it is possible to obtain other beneficial properties such as water repellency, spot and stain resistance and modification of hand. Another very desirable and merchandisable property is that of deodorizing or germ inhibition; this can be accomplished by including an appropriate textile germicide in the finish.

These are the plus values of applying thermosetting resins or cellulose reactants to the cloth. However, most of you know that the problem is not just that simple. Effective treatments to accomplish these highly desirable effects will result only by using suitable chemicals, and by applying them to properly prepared goods in suitable equipment, under controlled conditions.

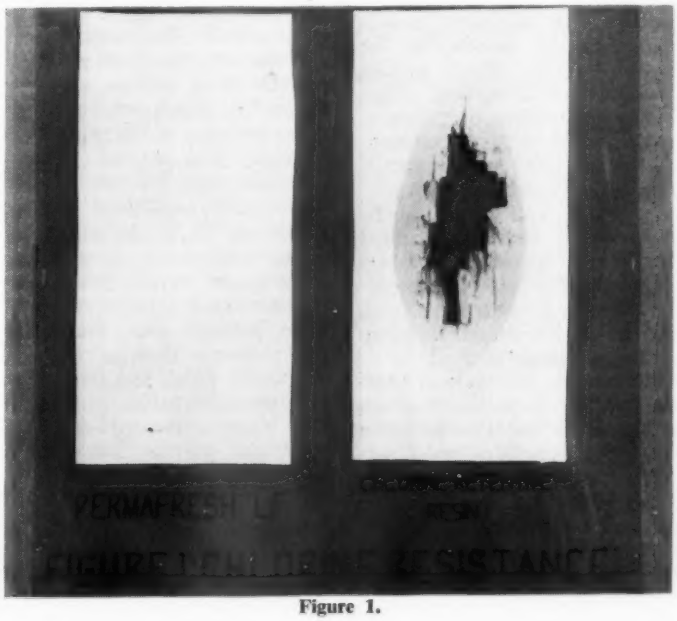


Figure 1.

Fabric Construction

Let us turn now to consideration of the fabric which is to be finished and to its preparation so as to obtain optimum results. In the first place, if satisfactory, balanced dimensional stability is to be obtained, then the fabrics must be knitted at a width approximately that of the desired finished width. It's an all too common practice to attempt to produce a finished width on a fabric which has been knitted much narrower or much wider. This requires either excessive stretching in the width, or excessive stretching in the length to attain the desired finished width, and usually re-

(*Continued on Next Page*)

sults in fabrics of poor dimensional stability in the direction in which the fabric has been stretched.

A second important consideration in the construction of the fabric is the strength properties required in the finished goods. It is a well established fact that resin stabilizing treatments invariably result in a certain amount of reduction of the bursting strength of the fabric. This is due to the fact that the resin changes the elongation properties of the fibers, and reduces the load distribution potential of the fabric. The degree of reduction of bursting strength varies to some extent with the particular resin used and the amount applied, and some of the experienced finishing plants can predict very accurately the reduction of bursting strength which can be anticipated.

However, the important point to remember is that the original fabric, as it is being knit, must be designed to have sufficient strength so that the finished fabric will still be serviceable after the loss in strength which will result from resin finishing.

The preparation of the fabric prior to finishing requires a certain amount of attention and control. Because these thermosetting resins are used with acidic type catalysts, it is important that the fabric be properly rinsed of any alkalies which might have been used during bleaching or dyeing so as to obtain the maximum effectiveness of the catalyst. Even on goods which have been yarn dyed, it is a good practice to scour the fabrics before finishing to remove residual impurities, and to improve the absorbency.

We come now to the finishing operation itself. As you know, tubular knit fabrics present special problems in the mechanical handling of the fabric because of the tubular construction and the requirement of processing the fabric in double thickness. special equipment and techniques have been developed to perform the finishing operations of fabrics in tubular form. Namely, these operations are: stripe matching, extracting, padding, drying, curing, and calendering. Probably the most widely used equipment to perform these finishing operations is the type

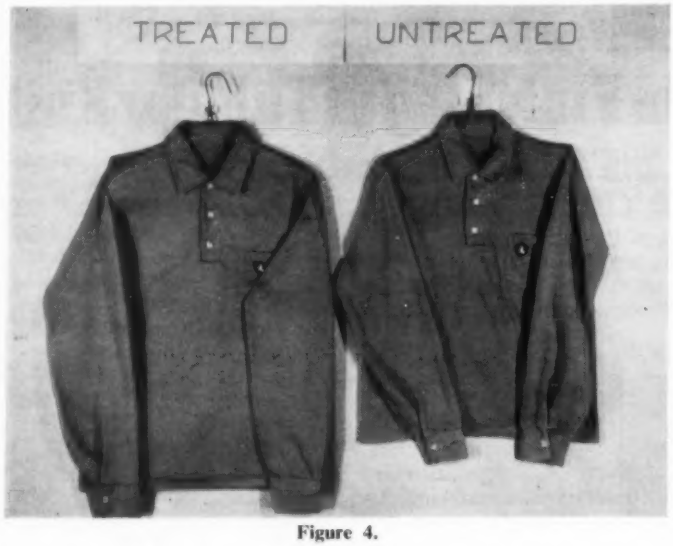


Figure 4.

manufactured by Tubular Textile Machinery Corporation of Woodside, N. Y.

For fabrics which have a striped pattern, we recommend that the stripe matching operations be performed on the fabric before treating with the resin.

In the impregnation of the fabric, it is preferable to treat dry fabric for the sake of better control and greater uniformity of treatment. Thus, dry goods are fed to the Tube-Tex pad which is capable of keeping tension to a minimum. The approximate desired finished width of the fabric, after curing, should govern the spread width of the fabric on the pad.

From the padder, the fabric can be fed directly to the dryer. It is important that dryers used for this type of work have a relaxed feature, allowing for the drying of the fabric without stretching or distortion. After drying, the curing operation is performed on similar equipment but at elevated temperatures. The speed at which impregnation, drying, and curing can be performed, is usually controlled by the rate at which the fabric can be dried and cured. Increasing the temperature of drying and curing will permit speed-up of these operations.

The final mechanical treatment which is normally given these fabrics is the so-called calendaring operation which permits a final inspection of the fabric with certain provisions for correcting width, ripples, bow, and provides a means to impart a smooth attractive appearance to the finished fabric.

To sum up on the mechanical aspects of finishing, I would like to emphasize that with the use of proper equipment and strict adherence to tension-free finishing techniques, we can eliminate many of the defects that occur in the shrinkage stabilization of knit goods.

Chemical Considerations

I have gone into some of the considerations concerning the construction of the fabric, the preparation of the fabric, and the mechanical handling of the fabric during finishing. I come now to the real key to the stabilizing process, and this is the selection of the resin and the development of the finishing formula. In a talk like this, it is impossible for me to go into many details. The best that I can do with the limited time available is to outline some of the factors which are involved in the selection of the resin, and to show you several typical formulae which have been field proven to give excellent results.

First of all, if the fabric to be treated is white, or contains white stripes, or is printed with a pattern having large areas of white ground, then the resin used should be chlorine resistant so that the finish and the fabric will be unaffected if the housewife bleaches the garment. An indication of the effects of bleaching resin treated cloth is shown in Figure 1.

Instead of the destruction of the fabric, which is evident here, some finishes turn yellow when bleached, and this is also highly objectionable. Also, on whites where fluorescent brighteners are used, the resin and catalyst must be selected which will cause a minimum suppression of the fluorescent effect. On the other hand, if the fabric is dyed in a solid shade or has an over-all print, chlorine resistance is usually not required, but the resin chosen must not adversely affect the lightfastness of the dyestuffs used.

If hand builders, weighters, water-repellents, germicides, or other additives are to be included, it is important that they form compatible mixtures, and that their effects supplement those of the resin. Weighters can be particularly troublesome, because many commonly used weighters interfere with curing of the resin.

In addition to the chemical and physical factors which are involved in the selection of finishing compounds, I think it's also important to emphasize that the use of branded or tradenamed products help to up-grade the quality of the merchandise in the minds of the consumer. Backed by the integrity of the manufacturer along with an intensive and sustained promotion program, branded products like Permafresh-Norane increase the entire market for all concerned.

Now, I'd like to show you some typical formulae which are in widespread use.

1. Chlorine resistant finish on whites where compatibility with fluorescent brighteners is required; shrink resistant and wash-wear properties, relatively soft hand:

15%	Permafresh 197
1%	Mykon SF
4.5%	Catalyst LO
0.1%	Acetic Acid

2. Shrink resistant, wash-wear finish on dyed and printed goods; minimum effect on light fastness; medium firm hand with spot and stain resistance:

15%	Permafresh 424
2%	Solvitose HDF
6%	Norane KN
1%	Buffer 295
4.5%	Catalyst LO

3. Low cost shrink resistant finish; with firm hand; spot and stain resistant:

22%	Permafresh 459
2%	Solvitose HDF
6%	Norane KN

(*Continued on Page* 31)

NKOA Convention Proceedings

New Techniques In The Dyeing And Finishing Of Orlon

By LEE BIDGOOD
Textile Fibers Dept., Du Pont Co.

IN the area of fiber processing, Du Pont has developed in conjunction with a machinery manufacturer an improved cycle for relaxing Orlon acrylic fiber in the Turbo fiber-setter. This Turbo fiber-setting or steaming operation is an important step in making Turbo high-bulk yarns from Orlon tow. The improved steaming cycle furnishes additional insurance that all the fibers reach the same temperature in the machine. This means that the yarn spinner now has a greater margin of safety in providing you with yarns of uniform bulk and uniform dyeability.

Turning now to the field of dyeing, versatility is the keynote for Orlon acrylic fiber. We have assisted and encouraged the dyers to develop processes for dyeing Orlon in any of its forms. The result is that Orlon today is dyed as tow, raw stock, and top, as yarn in skeins or in packages, and as garments or strips—either as 100 percent Orlon or in blends with other fibers. Competent and experienced dyers serve the industry in all of these areas.

Each of these dyeing methods provides the knitter with a means of producing garments distinctly different from those dyed by other routes. This is what we mean by dyeing versatility.

Tow dyeing, for example provides high-bulk heather shades in three or four colors. Tow-dyed garments are bulked in fabric or garment form and they have a maximum of surface cover or blending of the stitch. On the other hand, skein dyeing gives a garment of an entirely different character—these sweaters have the "clean stitch" look. Skein dyeing is extremely popular for bulky knits, of either Orlon Type 42 or Orlon Sayelle, Du Pont's bi-component acrylic fiber.

Package-dyeing techniques have been improving steadily with respect to the degree of bulk obtained. High-bulk yarns today are being package-dyed with bulk and loft approaching that of skein-dyed yarns plus the economy inherent in the package-dyeing route.

A different technique has been developed by Du Pont for package dyeing high-bulk yarns. A cellulose sponge is used as a covering for the conventional dye tube. The sponge is easily compressed in the hot dyebath as the yarn shrinks and bulks. Du Pont has applied for a patent on this technique and we are prepared to license dyers for its use on a royalty-free, non-exclusive basis. Applications for licenses should be directed to our Fabrics and Finishes Department.

We think you can look for increasing popularity of package-dyed yarns. However, skein-dyed yarns likely will remain as the premium yarn dyed product, both for Type 42 and for Orlon Sayelle acrylic fiber.

Multi-Colored Heathers

Raw stock and top dyeing are additional routes to multi-colored heathers, for those uses where the dyed fibers don't have to be the high shrinkage type. Orlon Sayelle is particularly adapted to top dyeing. Its built-in permanent reversible "corkscrew" crimp contributes to good mechanical handling in the dye-bath. And, of course, you don't need high shrinkage fibers to make bulky fabrics of Orlon Sayelle. We predict that top dyeing will be quite important with this new fiber.

Next let's consider piece dyeing. This is the oldest and still the most widely used route for dyeing Orlon, though there has been a trend away from piece dyeing with the advent of the bulky knits. Should the fashion pendulum swing toward the classic sweaters, you can expect increased emphasis on piece dyeing.

In addition to the ever popular solid colors, two-color effects can be cross-dyed with blends of Orlon and wool, cotton, or rayon. Further styling in the piece-dyed blends might be obtained by including color-sealed black Orlon to give a third color. For more complicated styling, tow, top, or yarn dyeing will continue to be used.

Whatever method of dyeing best suits your operation, you can rely on the quality of dyeing you get with Orlon acrylic fiber. Experienced dyers using proven methods can deliver fastness and brilliance of shade on Orlon that is second to none. And don't forget the good whites, too. Orlon maintains leadership as the whitest acrylic fiber in the business.

In finishing operations, the color of dyed Orlon is unaffected by normal finish application and colors are fast to steaming. This insures close matching of shades.

Among finishing developments the growth of the napped and sheared interlock or plush knit is noteworthy. This garment seems destined to become a stable basic type. Furthermore, there are many possibilities for diversification of the napped and sheared texture into knitted outerwear other than sweaters. This concept will be discussed in more detail this afternoon.

Knitting Ideas With Acrilan 16

(*Continued from Page* 7)

The fourth is a traditional diamond jacquard knit from 2/14s yarn on a six cut machine. The dark blue diamond is the 100 percent Acrilan, the light blue is a 65/35 blend and the white is 100 percent Acrilan 16 left undyed.

The fifth is also a 2/14s yarn with a stripe arrangement utilizing 100 percent Acrilan, 100 percent Acrilan 16 and the 65/35 heather of the two.

The sixth is a narrow stripe on a finer gauge machine using just the 100 percent Acrilan and 100 percent Acrilan 16.

Here we have a 2/20 skein dyed yarn knit on a four-cut flat machine. The blend here is 90 percent Acrilan and 10 percent Acrilan 16. This was dyed black on the Acrilan resulting in a charcoal heather color because the 10 percent Acrilan 16 was left undyed. This unique blend of Acrilan fibers and deniers gives us a very desirable imported, Shetland-like hand.

Last we have a 2/20 skein dyed yarn, a blend of 65 percent Acrilan and 35 percent Acrilan 16. This was dyed into a copper and green combination, by making these two colors from a combination of six different dyestuffs, we have achieved a color comparable to the finest tow dyed acrylics.

To summarize, we have represented here sweaters that would add quality, style, color and diversity to your line, knit from a truly versatile fiber, and these are not the only "extras" of Acrilan. You have economy of manufacture. Your inventory of yarn is substantially less than if you had to provide these colors separately. Yarn or knitted up material, if it's left over, can be dyed in the colors of the up-coming season. Dark tones for fall and pastels for spring are equally dyeable on the same cloth.

I've been in the knitting business for twenty years, and you grow up with certain instincts. One is don't talk about dyers or dyeing when you're not one yourself. Frankly, I can't resist saying a few words on the subject.

Dyeing Programs

Many knitters have wasted their time and money and the dyers' time and money. I can say with candor that the commercial dyers are a very cooperative group of men, but not when you want them to spend days making formulas and you won't take a half-hour's time to work out in your own mind the effects you wish to achieve. If you will take the trouble to look at the samples that they have and plan your work accordingly, your line can be complete in no time. Dyeing is an exact science. Give the dyers a half-pound of fabric for a ten-pound machine and you'll get a rough idea of the kind of sweater you might end up with. In all probability, you will not have the correct hand or the exact color. It will be a starting point only. If you plan your work with the dyer's problem in mind, I guarantee results quickly.

NKOA Convention Proceedings

New Prospects In The Manufacture Of Knit Pile Fabrics

By VICTOR J. LOMBARDI
Product Development, Scott & Williams, Inc.

THE success currently being enjoyed by pile fabrics unquestionably stems from exciting technological advances in the development of new synthetic yarns, specially-engineered knitting machines and improved techniques of fabric finishing. This happy combination of distinct technologies has sparked the development of a multitude of different pile constructions which find application in fields as diverse as liners, paint rollers, toys, fur coats, scatter rugs, and carpeting for automotive, commercial, and domestic use. The unique nature of a knitted fabric with its built-in advantages of hand, drape and formability, holds out the promise of more exciting applications in the months ahead. Much can be said of each aspect of this success story. However, I should like you to consider with me this afternoon primarily that phase dealing with the knitting of these fabrics.

Taken broadly, knitted pile fabrics can be produced in three distinct ways, i.e., with sliver, loop, or inlay constructions. From the standpoint of the loop and inlay constructions, my comments will be limited to machines of sinker top and of dial cylinder design.

Sliver Principle

The machines operating on the sliver principle have associated with each yarn feeding station a carding attachment which insures the introduction of the fibers from the doffer to the needles during the course of knitting. A backing yarn, forming a conventional jersey stitch, serves to lock the pile fibers into the fabric. The problem of lint is dealt with by means of a vacuum attachment mounted inside the cylinder. Pile height is determined by the length of sliver, and fabric weight is governed by sliver weight and also by the rate at which the sliver is deposited into the hooks of the cylinder needles.

The rotational speed of the doffer is a major determining factor in this regard.

In view of the random pile height of sliver knit fabrics, a shearing operation is normally one step in the finishing of these constructions. Inasmuch as attempts to piece-dye fabrics of this nature have not as yet been commercially successful, the use of dyed stocks is required.

Terry Machines

A second type of pile fabric, in this instance using yarns, is produced in combination with loop-forming elements. The well-known terry fabric machines of open top construction employ a long-nosed sinker as the loop forming element. In this arrangement, the body yarn is fed below the sinker nib, and as the sinker is advanced inwardly of the cylinder, the pile yarn is introduced into the hook of the needle above the sinker nib. Both the body and pile yarns, therefore, form knitted loops in a plaiting relationship, the distinction being that a long sinker loop is formed with the pile yarn and a conventional sinker loop with the so-called body yarn.

In order to effect greater control on the pile loop, the sinker can be designed with a second throat inwardly of the lower throat. When the sinker is advanced in knocking over the previously formed needle loop, the upper throat will exert a slight pressure on the pile loop, resulting therefore in a more uniform pile, a firmer fabric, and a cleaner appearance to the technical face of the fabric.

Design effects in the pile are readily achieved through horizontally-mounted pattern wheels. These determine whether a sinker is to be actuated inwardly to form a loop over its nib or left in an inoperative position, in which case the pile and body yarns form conventional sinker loops in plaited relationship over the lower sinker edge. The dimension between the sinker nib and the sinker ledge determines the height of pile, and changes are normally achieved by resorting to sinkers with different nib heights.

Although these terry constructions are frequently left with the loops intact, they also effectively lend themselves to subsequent shearing with nibs at two levels. These multi-height terry constructions can be random sheared with striking effect. It might be noted that attempts to cut the sinker loops on the knitting machine during the process of knitting, thereby saving yarn and eliminating a subsequent shearing operation, have not been commercially successful. The patent art suggests the cutting of these loops by the crushing action of a hardened roller, which, bearing down heavily on the sinker nibs, severs the sinker loops at dead center. This technique is of questionable effectiveness, and to the best of my knowledge has not been used commercially.

In speaking of machines of open top construction, it should be mentioned in passing that pile fabrics can also be made on an ordinary inlay basis, or with a tie-in yarn setup. The normal inlay structure is so basic that it warrants little elaboration. It involves merely the use of a body yarn forming a basic jersey fabric, and an inlay yarn which is caught into the fabric at selected points. Since the inlay yarn is not interknit with the body yarn but simply caught into the fabric between needle and sinker loops, coarse count inlay yarns can be effectively utilized to produce heavy weight pile fabrics. However, since the inlay yarn is caught between the needle and sinker loops, it frequently "flashes" through to the technical face of the fabric, resulting in a surface of irregular appearance. Quite understandably, the heavier the inlay yarn, the more pronounced this tendency. Consequently, these fabrics are not normally used in those applications where the technical face of the fabric is to be worn as the exposed side of the garment.

However, this "flashing" condition can be eliminated by producing a so-called tie-in fleece. This work requires the use of a double level sinker and three ends of yarn for each productive feed. One end represents the inlay yarn, the second the tie-in yarn, and the third the body yarn. In this construction the inlay yarn is caught between the body loop and the tie-in loop, thereby resulting in a fabric of exceptionally clean face. Perhaps one of the most popular applications for this construction is in sweat-shirts wherein the face of the fabric is worn on the outside and the fleece next to the body.

VICTOR J. LOMBARDI

Dial and Cylinder Units

A third and what is considered by many to be the most versatile method for producing pile fabrics is by means of dial and cylinder machines in which the loop forming elements are in the dial. The versatility of machines of this design stems from a number of factors:

1. They are multi-purpose units in that the whole spectrum of pile fabrics from light weight apparel to heavy weight industrial use is readily producible. Just to note a few, these include the so-called scatter rugs, fabrics for the fur, liner and upholstery trades, and carpeting for automotive, commercial and domestic use.

2. Variations in height of pile on these machines are readily effected by a single adjustment which raises or lowers the dial as the final product dictates. Loops in excess of ¾ of an inch can be produced, depending on the specific technique used.

(*Continued on Next Page*)

3. A dial and cylinder design will handle both natural fiber and synthetic yarns; whether spun or continuous filament. In proper gauge, yarns as heavy as those found in the carpeting field can be successfully knit. Significantly, these loop fabrics can be piece-dyed without difficulty.

The loop forming element in machines of dial and cylinder design can take the form of a dummy needle, i.e., a needle without hook or latch, an inverted needle without the latch, or a rocking jack. The use of a straight dummy jack in the dial to form the pile loop is old in the knitting art and does not constitute novelty as defined in the patent office. On the other hand, the inverted hook needle and the rocking jack are of more recent vintage and represent patentable art.

With all types of dial elements, it is possible to form a snag-proof loop fabric in which the pile yarn is interknit with the body yarn. In this construction, the pile yarn is introduced into the hook of the cylinder needle above the dial element, and the body yarn fed into the needle hook below the dial element. Both these yarns are then pulled through the previously formed needle loop as this needle is retracted. Similarly, by suitable camming of the needles and dial elements, the pile yarn can be positioned below the latch, thus tying in this yarn on a non-knit basis. In order to achieve this latter construction, an interlock actuation of dial jacks and cylinder needles is normally used.

Perhaps the most novel of the dial elements is the rocking jack now in use on a machine recently announced in the trade. As the name implies, this jack is designed with a fulcrum point which, through suitable camming, permits the nib of the jack to be rocked upwardly. The method of feeding the body and pile yarns is identical with that earlier described — namely, the pile yarn above the dial element and the body yarn below. However, the point of distinction with the rocking jack is that after the pile yarn has been introduced, the nibs of the rocking jacks are crammed upwardly simultaneously as the cylinder needles with the pile yarn in their hooks are actuated downwardly. With this approach, additional pile yarn is furnished, and consequently fabric of deeper loop construction can be produced. This design makes possible the production of a dense, uniform, high loop fabric in which both the body and pile yarns may be made to appear on every needle and in every course.

You may recall my earlier reference to the inherent feature of formability found in knitted constructions. In combination with this feature, a fabric of dense and uniform loop construction suggests many interesting applications for the future. Although not so limited, let us just for a moment consider the field of automotive carpeting. This carpeting for the most part is of tufted construction in which a woven backing fabric is generally used. The woven backing imparts to the fabric a dimensional stability which, ironically enough for an automotive carpeting application, can create one major drawback—it resists the forming of this fabric to the contour of the car floor. This has usually necessitated a cutting and fitting operation with additional labor costs. On the other hand, a knitted fabric can be molded to a precise contour thereby eliminating all cutting, trimming, and fitting. In this instance, the carpet is merely dropped into place without tedious and time-consuming labor. The same analogy can be made in other areas where the feature of moldability will play an increasingly important role.

This has been an all too brief excursion in the broad fields of pile fabrics. Time has not permitted too close a scrutiny of this fascinating area. Much has been done in recent years to enhance the application of pile fabrics for new end-uses. The surface has been barely scratched. In the hands of an alert, progressive management, the products of research and development will continue to insure an even brighter future for these constructions.

NKOA Convention Proceedings

Laminating Knit Yardgoods

By FRANK LESSER
Sales Manager, Curon Division, Reeves Brothers, Inc.

A NEW and revolutionary development has been taking place in the knitted material industry during the past few years. This is the use of polyurethane foam laminated to fabrics. The story of this development traces back many years and originated with laminates for many industrial purposes. As a substance, in itself, polyurethane foam has a number of remarkable qualities. It is flexible, has no loss of elongation properties and no loss of strength. It does not age and has no deterioration —will outlast any garment. It is outstandingly resistant to perspiration, is not affected by soap, detergent or dry-cleaning fluids. It has no odor. It completely resists mildew, bacteria and fungus. It's non-allergenic and non-toxic. It's flame resistant; it dries quickly. Polyurethane foam is ideal for the wearing apparel industry—especially its characteristics as an insulator.

These properties have long been quite evident due to its unique multi-cellular construction. Thousands of tiny trapped air spaces exist in this unique material which in addition to its insulation value is also virtually weightless. A very simple demonstration of this fact is in my hand. The amount of foam I have here will line a complete, full-length ladies' coat. When I place it on the scale you can see that it weighs exactly eight ounces. Laboratory tests have shown that with this slight additional weight, a wool garment is more than doubled in its warmth qualities. This permits the use of lighter weight and, therefore, less costly shell fabrics. Foam also helps stabilize bulky knits, greatly increases their drapeability and prevents sagging and stretching.

These basic facts started a wholly new outlook for the outerwear industry. But, like a bridegroom on his nuptial day, it wasn't just the beginning of a true romance, it was something that would soon lead to all the advantages—and problems—of a true wedding.

In the beginning, those of us who pioneered the use of polyurethane foam for apparel, were confident we had a fantastic product. Some of us were a bit cocky about it and unfortunately many serious mistakes were made in initiating its marketing.

At the outset we did have a lot of knowledge but unfortunately in too many cases it was ineptly applied because we lacked practical experience. We have now gained this experience. We have learned how to overcome many of our early problems.

In the beginning, laminators were not equipped to guarantee widths, to eliminate center creasing in tubular materials or to return a uniform piece of goods.

Now, with new and thoroughly tested equipment, these problems have been eliminated. Today materials arriving at laminating plants 52-54″ wide, a controlled 50-52″ width is returned with no center crease.

Today, some of the leading laminators have installed their own steaming, calendaring and splitting equipment. Laminating techniques are greatly improved and the locations of laminating plants are now much more accessible to the industry for quicker deliveries and greatly reduced freight charges.

I think you will find it interesting to know that four of the leading laminators in this area, whom the knitted outerwear industry use principally, have formed an association in order to set up industry standards to combat these problems and to seek their solutions and to provide other uniform standards of working loss, terms of sale, etc.

One problem which is still quite serious is the difficulty in getting a firm bond to fabrics with a silicone base water repellent.

Whenever a fabric is heavily treated with a silicone, it becomes exceedingly slippery and, therefore, difficult in the heat sealing process to get a firm lamination without burning off an excessive amount of foam.

The chemical companies manufacturing these solvents are working on the problem. As a matter of fact, my company, Reeves Brothers, is very close

(*Continued on Page* 38)

NKOA Convention Proceedings

Production Controls In Knitted Outerwear Operations

By TED A. PODBERESKI
Knitting Mills Consultant

WE ALL agree, I feel sure, that the general acceptance of the sweater as an indispensable wearing item was brought about by the eye appeal and remarkable practicality of the man-made fibers. We all remember the Orlon interlock coat, cardigan and pullover we made in great quantities and sold profitably. The fiber manufacturers have retained the advantage of mass appeal through improvement of fibers already on the market and through development of new wonders with very fascinating names.

Once it became fashionable, the sweater had to be highly styled to maintain its mass attraction, and in this respect the American manufacturer has done an excellent job, even though the job has been done at the high cost of his peace of mind and at a loss of the margin of profit.

It is my belief that the reduced, or even lost, profits by previously successful manufacturers have not resulted simply from more competitive pricing policies, tougher competition, as we call it. It is the tremendous variety in styling, which we are not equipped to handle efficiently, the comparative loss of the mass production methods, which were characterized by few styles and large volume of each and, therefore, simplicity which have undermined profits

In brief, we have grown in the size of our plants, we have diversified our product, but we have not adjusted our internal organizations to these revolutionary changes and are now paying the penalty for it.

One important aspect of manufacture which should be revised in order to improve the efficiency of production through a return to the mass production methods, to speed up the turnover of goods in process and to maintain good deliveries is reduction planning and control.

For illustration, I propose to take a large firm producing, say, 1,200 dozen sweaters per week or more. The size does not really matter, except that in a smaller firm the solutions may be simpler.

The firm in our example makes transfer goods on three basic cuts of circular machines, using six different types of yarns to make 80 styles of sweaters, each style having four colors and four sizes. A manufacturing picture such as this is not uncommon, I find.

If we now take the styles, sizes and colors we will find that we have to make 1,280 items, each having different weight and size specifications. Many of these 1,280 items have to be run concurrently, have to be delivered in exact quantities, in exact combinations, within exact delivery periods.

If we now assume that each item has to be handled 15 times between yarn and packaging (a very conservative figure), we find that there are 19,200 steps to watch from the point of view of quality, labor efficiency and flow. This is quite a burden for our plant managerial staff, especially if we want a quality product.

I find in plants where quality is unreliable, where technical mistakes are made, where labor is inefficient and, lastly, where the work cycle is long and deliveries unreliable that the one manager and his few supervisors are hopelessly overburdened with every aspect of production. They have insufficient time, not to say talent, to perform all their functions properly and on time.

I suggest that just as we broke up and de-skilled our stitching rooms, we should now try and de-skill the jobs of our supervisors and, by doing so, improve their efficiency and that of our plants.

You will ask, how can we de-skill a supervisor's job? Let us simply take the planning and control of the flow of goods away from him and turn it over to a production control department or even a clerk. Let us take away from the supervisor the task of searching for the right types of goods to be made this very minute and give him a manufacturing program which he has to fulfill daily.

Let us put on his doorstep the right types of goods with which to fulfill his daily program, and by doing so let us remove the guesswork and the peaks and valleys in flow and in employment of his help. Let us take away from him the need for making constant inventory lists of what he has in process in his department. Lastly, let us provide him with all the necessary technical information regarding the making of each style and thus put an end to the need of relying on the imperfect and overburdened human memory. Supervision of quality and efficiency of his people, together with the fulfillment of a known daily manufacturing program is enough of a burden for a supervisor. Let him run his department. Do not let him run the entire factory; the job is too difficult and mistakes are too costly.

Designing of the daily manufacturing program which provides the utmost style continuity and regulating the flow of goods will now be the task of the production control department. Given the control tools it can do the job much better and cheaper.

How do we go about the transfer of the control responsibilities?

(*Continued on Next Page*)

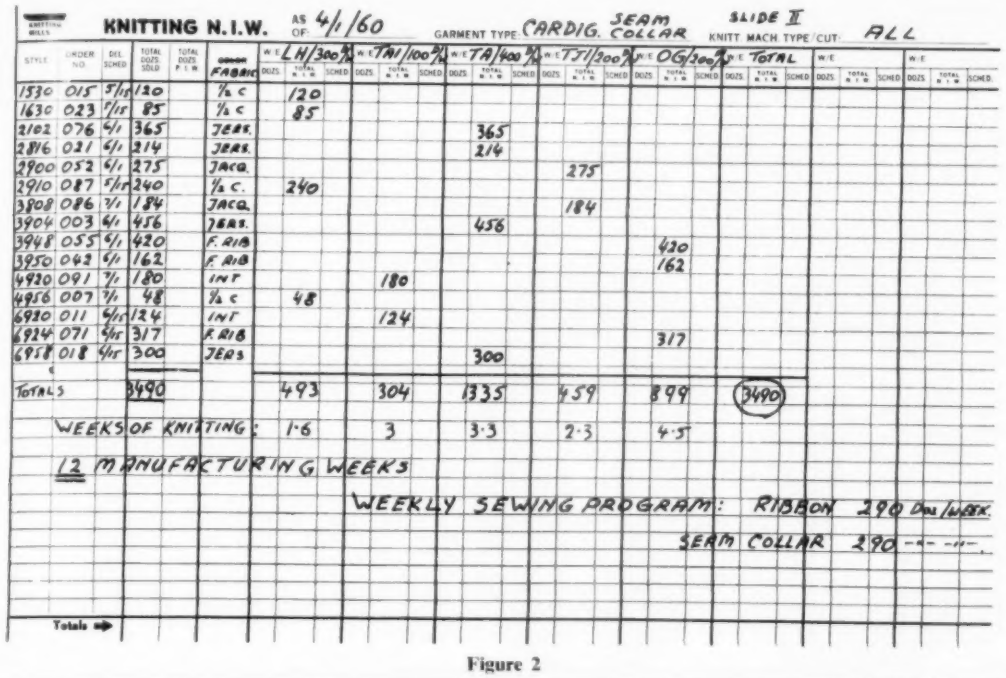
STYLE GROUPS: CARDIGANS & COATS

	Loop Coil Cardigan		Seam Coil Cardigan		Seam Vee Coat		3 Needle Vee Coat	
Slide I.	M/c	Style	M/c	Style	M/c	Style	M/c	Style
	TA	1510	LH	1530	TA	1618	LN	3962
	TA	1512	LH	1630	TAI	2182	TA	4608
	TA	1616	TAI	2102	TA	2858	LN	4962
	TAI	2104	TA	2816	TA	3324	OG	4968
	TAI	2124	TJI	2900	TA	3330	LN	6632
	TA	2802	TJI	2910	TA	3382	LN	6962
	TA	2814	TAI	3808	TA	3368	OG	7648
	TA	3218	LH	3904			OG	7966
	TA	3222	LH	3948	Shark Cuff			
	TAI	3806	TA	3950	LN	3960		
	TAI	3810	OG	4920	LH	4960		
	TA	4202	OG	4956	LH	5960		
	TA	4210	LH	6920	OG	7228		
			OG	6924	OG	7238		
			OG	6958	OG	7248		

PULLOVERS:

	Loop Coil Pullover		Seam Coil Pullover		Rolled Edge Pullover		Shawl Pullover	
	M/c	Style	M/c	Style	M/c	Style	M/c	Style
	TA	4203	TA	4211	TA	1514	OG	4337
	TA	4213	TA	4925	TA	1517	LH	4339
	TA	4251	TJI	4927	OG	3315	LH	4911
	TA	4411	TA	4931	OG	3333	TJI	4923
	TA	6101	TJI	4933	LH	3371		
	TA	6213	LH	6111				
	TA	6251	LH	6113				
	TJI	6310	OG	6117				
	TJI	6363	OG	6121				
	TA	6371	TJI	6123				
	OG	6401						
	OG	6411						

Figure 1



KNITTING N.I.W. AS OF: 4/1/60 GARMENT TYPE: CARDIG. SEAM COLLAR SLIDE II KNITT. MACH. TYPE/CUT: ALL

STYLE	ORDER NO.	DEL. SCHED	TOTAL DOZS. SOLD	TOTAL DOZS. P.I.W.	FABRIC	W/E LH/300 % DOZS	TOTAL N.I.W.	SCHED	W/E TAI/100 % DOZS	TOTAL N.I.W.	SCHED	W/E TA/400 % DOZS	TOTAL N.I.W.	SCHED	W/E TJI/200 % DOZS	TOTAL N.I.W.	SCHED	W/E OG/200 % DOZS	TOTAL N.I.W.	SCHED	W/E TOTAL DOZS	TOTAL N.I.W.	SCHED	W/E DOZS	TOTAL N.I.W.	SCHED	W/E DOZS	TOTAL N.I.W.	SCHED
1530	015	5/15	120		1/2 C	120																							
1630	023	5/15	85		1/2 C	85																							
2102	076	4/1	365		JERS.							365																	
2816	021	4/1	214		JERS.							214																	
2900	052	4/1	275		JACQ.											275													
2910	087	5/15	240		1/2 C.	240																							
3808	086	3/1	184		JACQ.											184													
3904	003	4/1	456		JERS.							456																	
3948	055	4/1	420		F. RIB													420											
3950	043	4/1	162		F. RIB													162											
4920	091	3/1	180		INT				180																				
4956	007	3/1	48		1/2 C	48																							
6920	011	4/15	124		INT				124																				
6924	071	4/15	317		F. RIB													317											
6958	018	4/15	300		JERS							300																	
TOTALS			3490			493			304			1335			459			899			3490								
WEEKS OF KNITTING:						1·6			3			3·3			2·3			4·5											

12 MANUFACTURING WEEKS

WEEKLY SEWING PROGRAM: RIBBON 290 Doz./WEEK

SEAM COLLAR 290 -"- -"-

Totals ➡

Figure 2

In April and May a sweater firm should have a tight program of delivery of goods extending at least until vacation.

Bearing in mind that in our firm we have to manufacture about 80 styles, many of them concurrently, let us design a manufacturing plan for the best, fastest and cheapest flow.

We must try and revert back to the mass production methods, despite the number of styles to be made. We can do this by combining the different styles into family groups according to the sequence of operations and the types of skills required in the sewing department — our greatest and most difficult cost center.

The idea is quite simple. If we want to make cardigans with ribbon backing we must have operators who will stitch the ribbons. It does not really matter whether the cloth is bulky or fine gauge interlock; stitching ribbons requires the same skill whatever the cloth.

In Figure 1 we see such a grouping of styles according to the sewing skills required.

Thus we have two types of cardigans: with looped and with seamed collars. For the ribbon stitchers we shall combine the two groups into one stream of steady, daily flow.

For the collar loopers we shall, of course, combine the looped collar cardigans and pullovers. The loopers don't care what it is, as long as the collar has to be looped. For pocket stitchers we must provide a steady flow of coats with overlock seamed borders, two-needle Union Special borders and the shawl collar garments, etc.

Now, we don't have to expect the supervisors to remember every style. We shall train them to think in terms of style groups and their importance for mass production methods of manufacture.

In Figure 2 we see the family of cardigans with seamed collars. The styles are listed vertically. Alongside are the order numbers, the delivery dates and the dozens sold in each style. Across the sheet I have listed the different knitting machine centers and the weekly knitting capacity of each center. The dozens sold are again listed under the appropriate knitting machine center.

This arrangement offers, in my opinion, the great advantage of simplicity. We know at a glance:

1. What each knitting center has to manufacture and the extent of loading of each center, and

2. How big a program we have in seam collar cardigans.

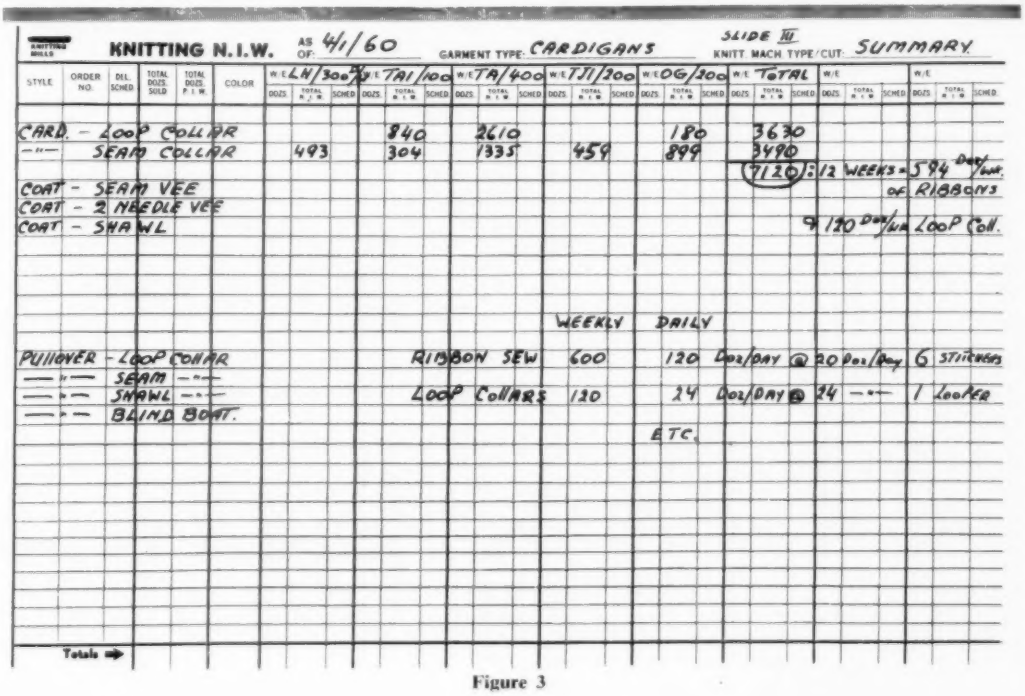
Since we have 12 working weeks, we must arrange a group flow of 290 dozens per week.

Let us go a step further in Figure 3 by combining the two groups of ribbon cardigans: those with looped and seamed collars. It will be seen that the arrangement is again by the knitting machine centers.

We now find that in order to fulfill the 12 weeks' program we must stitch almost 600 dozens of ribbon cardigans per week. This represents a steady volume of 120 dozens per day, enough work for, say, six stitchers.

You will notice that the arrangement of groups of styles centers around the sewing department and not around knitting. This is based on the reasoning that it is easier and cheaper to switch knitting ma-

(*Continued on Page* 32)



KNITTING N.I.W. AS OF: 4/1/60 GARMENT TYPE: CARDIGANS SLIDE III KNITT. MACH. TYPE/CUT: SUMMARY

STYLE	ORDER NO.	DEL. SCHED	TOTAL DOZS. SOLD	TOTAL DOZS. P.I.W.	COLOR	W/E LH/300 % DOZS	TOTAL N.I.W.	SCHED	W/E TAI/100 DOZS	TOTAL N.I.W.	SCHED	W/E TA/400 DOZS	TOTAL N.I.W.	SCHED	W/E TJI/200 DOZS	TOTAL N.I.W.	SCHED	W/E OG/200 DOZS	TOTAL N.I.W.	SCHED	W/E TOTAL DOZS	TOTAL N.I.W.	SCHED	W/E DOZS	TOTAL N.I.W.	SCHED	W/E DOZS	TOTAL N.I.W.	SCHED
CARD. - LOOP COLLAR									840			2610						180			3630								
-"- SEAM COLLAR						493			304			1335			459			899			3490								
																					(7120) : 12 WEEKS = 594 Doz./WK.								
COAT - SEAM VEE																					OF RIBBONS								
COAT - 2 NEEDLE VEE																					7 120 Doz/WK LOOP COLL.								
COAT - SHAWL																													
															WEEKLY			DAILY											
PULLOVER - LOOP COLLAR									RIBBON SEW						600			120 Doz/DAY @ 20 Doz/Day			6 STITCHERS								
—"— SEAM —"—																													
—"— SHAWL —"—									LOOP COLLARS						120			24 Doz/DAY @ 24 —"—			1 LOOPER							
—"— BLIND BOAT.																		ETC.											

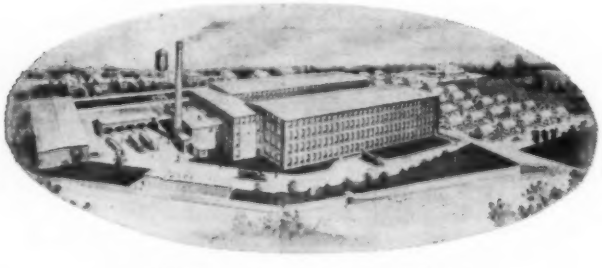
Totals ➡

Figure 3

WITH PRIDE
WE REFLECT ON OUR

50TH ANNIVERSARY

These have been truly eventful years for our organization. As we look back on our first half century of service to the knit goods industry, and look forward to the future we should like to express our thanks and appreciation to our many friends and customers for their respect and loyalty. We hope always to merit this trust.



All our yarns are spun at the Walter Marshall Spinning Corp. of R. I.

S. Brustein

ESTABLISHED 1910

96 Spring St., New York 12, N. Y.

Yarn Suppliers

S. Brustein Celebrates 50th Anniversary In Industry

By DORIS DIAMOND

S. Brustein is entering its 51st year as a family business. It began that way in 1910 when Max Brustein and his brother, Solomon, started the partnership as a resource for buttons and trimmings for the knitgoods industry—borrowing the initial of their father's name, Samuel, to title their firm—and were joined by two other brothers, Saul and the late Joseph Brustein, as soon as the latter two came out of school.

Brustein has remained a family firm through a half century of catapulting an initial capital investment of $1000 into a multi-million dollar business, of growth and development brought about by the needs of a changing and expanding knitwear industry.

In the interim, Brustein has gone from a button and trimmings house to a source for "artificial silk," or, as it is now known, rayon, to worsted wool yarns and, finally, to a major supplier of spun synthetic yarns, as well as worsted.

Grown With Knitters

According to Max Brustein, the firm feels that it has grown with the knitters it supplies, that "when we saw a need, an opportunity for greater volume, we stepped in."

When the business was started 50 years ago, Max Brustein had behind him four years of experience with H. Rottenberg & Son, a button and trimmings company. The brothers opened a facility at 260 West Broadway which in total approximated the area of Max Brustein's private office at the firm's 13,000-square foot site at 96 Spring Street in lower Manhattan.

At that time, Brustein sold sewing thread, parafin, pin tickets, buttons and the like. As Max Brustein relates it, one day one of the knitters whom the firm supplied came in with a sample of what proved to be the popular "artificial silk" of the era and asked to have it duplicated. The demand pattern was repeated frequently and the firm embarked on what might be described as a forerunner of market research analysis.

Artificial Silk Field

Brustein bought a 10-pound bundle of the rayon, had it dyed and wound and sampled it. The 10-pound bundle multiplied into 100-pound bundles, these into thousands. Brustein set up its own winding facilities in a loft on Broome Street, hired some 50 employees and from 1914 to about 1918 was in the "artificial silk" business.

During World War I, Max Brustein recollects, rayon yarn sold for as high as $15 a pound, as compared with a current price, for example, of 82 cents per pound for 150 denier filament rayon.

By 1918 the yarn needs of the sweater industry were already shifting and from that time until the fifties, Brustein concentrated on jobbing wool yarn spun on the worsted system. The move into the natural yarn field was complemented by a move to a larger site on Spring Street and in 1924 Brustein moved into its present location on that thoroughfare.

Spun Yarn Producer

In 1937, a shift of operations was brought about when the firm of Walter Marshall Spinning Corp. was established in Thornton, R. I. Since then Brustein has concerned itself exclusively with selling the yarn output of its New England spinner.

Another major reorientation came about in 1955, when the upsurge of interest in synthetic yarns made itself felt. What amounted to a rebuilding of the Walter Marshall facilities occurred to accommodate the American and Bradford spinning systems.

(*Continued on Page* 29)

Golden Anniversary

CONGRATULATIONS

S. BRUSTEIN ORGANIZATION

THE TOP COMPANY INCORPORATED

DARMAN DRAPER WALKER

Topmakers

WOONSOCKET, R. I. BOSTON 10, MASS.

ROYAL

THE FIRST NAME IN DYEING

.....extends

HAPPY 50th
ANNIVERSARY
GOOD WISHES to

S. Brustein

We're pleased to add our voice in tribute to this outstanding yarn organization — with whom we have been privileged to be intimately associated for many, many years. We wish you continued success.

Sam, Leonard and Herbert Katz

ROYAL YARN DYEING CORP.

ROYAL KNIT GOODS DYEING CO., INC.

340 MORGAN AVE., BROOKLYN 11, N. Y. **EVergreen 7-9000**

According to Martin Brustein, the son of Max Brustein and with the firm since 1946, this changeover necessitated a completely new body of technical knowledge, as well as reconstruction of the physical plant site.

Stress On Synthetics

Currently, 75 percent of Walter Marshall's output, which is about three to four million pounds a year, is synthetic yarn. Orlon is the primary product, while other emphasis is on nylon for knitted stoles, shawls and the like. Recently Orlon Sayelle has been added to the output. Worsted spun wool still accounts for 25 percent of production.

The 200,000 square foot spinning facility occupies two adjoining buildings. There are six sets of spinning frames or about 14,000 worsted and well over 6,000 twisting spindles on the premises. Some 500 persons are employed at the Thornton plant.

Shipping facilities, bookkeeping and a good deal of inventory are maintained by Brustein in New York City. Both natural and dyed-to-order yarns are sold.

Although Brustein sells the preponderance of its yarns to the knitting trade, it also provides weaving yarns and frequently is called upon to have yarns dyed-to-match for ensembles combining both constructions.

Martin Brustein is president of Walter Marshall. Other officers include Max Brustein's nephews, Arthur and Edward Siegel. The former is treasurer and mill manager and the latter is secretary of the corporation.

Arthur L. Schrempp Joins Huggins-Clelland, Inc.

Arthur L. Schrempp has joined the sales yarn firm of Huggins-Clelland, Inc. as representative for thrown synthetic yarns and textured filament yarns manufactured by Atwater Throwing Company, Plymouth, Pa.

Mr. Schrempp was previously with the Duplan Corporation for many years. He will make his headquarters in Yardley, Pa. and cover the Eastern part of Pennsylvania, Metropolitan New York and the New England area.

CONGRATULATIONS
TO
S. Brustein

HART TOP, INC.

Congratulations
to
S. Brustein
on its 50th Anniversary

Knitters can S-T-R-E-T-C-H their luck when they rely on Gilbertville service to and from New England.

Gilbertville Trucking Co., Inc.

A name respected in the Knitting Trade for Service

Box 58, Gilbertville, Mass.

OLympia 1-1400

CONGRATULATIONS
TO
S. Brustein
WE SALUTE YOU
ON YOUR
50TH
ANNIVERSARY
COLLINS & ROWBOTHAM, INC.
222 Summer Street, Boston 10, Mass.

Kintner Stresses FTC Position On Ad Allowances

(*Continued from Page* 1)

Mr. Kintner stressed, "this is the sort of the situation in which the Federal Trade Commission, with its present statutory responsibilities, has a strong interest."

Mr. Kintner further clarified the provisos of the Robinson-Patman Act by explaining that section 2(a) of the statute "declares it unlawful to discriminate in price between different purchasers of the same commodities where the effect of the discrimination may be substantially to lessen competition or tend to create a monopoly or to injure, destroy or prevent competition with any person (or his customers), who grants or knowingly receives the benefit of the discrimination."

Mr. Kintner explained that in complying with Section 2(d) of the statute, the seller is responsible for informing all of his competing customers of the fact that promotional allowances are obtainable.

He pointed out that the Commission is generally aware of the problems particular to the garment industry and that it has been informed by trade association representatives that "the advertising practices now engaged in have reduced the industry to chaos."

"We are told," he went on, "that in recent years department stores and department store chains have demanded greater and greater participation by suppliers in various promotional advertising efforts and that advertising allowances are made to meet demands of powerful buyers without any pretense of adhering to a cooperative advertising program available to all competing customers on proportionally equal terms as required by the law."

"The Commission will not ignore this situation, "but it cannot act on generalities. We shall need to discover and evaluate specific facts. The cooperation of each of you here today," Mr. Kintner told the luncheon audience, "will be important to the expeditiousness of any investigation and effectiveness of any remedy which may be developed."

SUPREME
congratulates
S. Brustein
on its 50th Anniversary
We pause to pay tribute to this fine firm
and our wonderful friends who head it.
Good luck and may we be able to keep
wishing you well for many anniversaries to come.
SUPREME SKEIN DYEING CORP.
SUPREME SYNTHETIC DYERS, INC.
315 Moffat Street, Brooklyn 27, N. Y.

New Style Notes For 1960 Charted

(*Continued from Page 9*)

ventilated bulky pullover which is achieving magnificent retail response, the extent of which is far beyond the wildest dreams of the producer. There are obvious growth possibilities through variations on the theme for men's wear and through interpretations of the idea for women's and boys' use.

Knitted Dress

Another "new" is the knitted costume look for women which is achieved by the use of our filament acrylic fiber, Orlon Cantrece. Through the use of this yarn, we offer the look, hand, and drape of pure silk knits with the added advantage of excellent "travelability" (if such a word exists), the easy care that is so much a uart of Orlon, plus the wonderful advantages of no sagging or bagging. This knitted costume look is interpreted in sweater and skirt combinations and also in knitted dress ensembles. We feel there is a great future for it.

Now, on the subject of variations on a theme or different applications to an old idea, we visualize increasing strength and popularity in both napped and sheared interlocks and brushed interlock fabrics of Orlon. When closely napped, these fabrics simulate the hand and look of Italian suede, for expression in men's vests with the continental influence, for sweater shirts, and even for cardigans. When loftily napped, the luxurious look and feel of cashmere results for use in ladies' dressmaker-style sweaters.

Look Of Mohair

The brushed interlock, on the other hand, offers the look and feel of mohair, especially when the heavier denier Orlon acrylic fibers are employed. Unique heather effects are obtained in both plain and jacquard patterns. And when combined with 15 to 20 percent Du Pont nylon filament or Dacron polyester filament or with wool or mohair, you have opportunity for beautiful multi-color effects, the mist type of colors we referred to previously.

As a final point, we see in the men's wear industry a resurgence of interest in fabrics produced by links machines. Several prestige style producers of both men's and women's sweaters and sweater-shirts are creating great excitement and excellent sales by producing the alpaca-look via the links and links route.

To sum up our comments, I think it's appropriate to say that our main purpose is to give you and even stronger feeling than you have had of the tremendous versatility and adaptability of the Du Pont family of fibers to knitwear. This is especially true with respect to the family of Orlon fibers — Orlon Type 42, color-sealed Orlon, Orlon Cantrece, and Orlon Sayelle. These family members represent an unbeatable combination in the knitted outerwear market for performance, styleability, and profit. It's small wonder that progressive and aggressive knitters everywhere are allying their futures with such a time-tested, proven, versatile fiber. They know its merits and they also know the strength implied by the continuing research programs and the hard-hitting advertising and promotion support at both trade and consumer levels. The consumer knows Orlon acrylic fiber, the consumer likes Orlon, and the consumer wants Orlon presented with your creativity.

Resin Finishing Of Tubular Knit Cloth

(*Continued from Page 20*)

1%	Mykon SF
0.5%	Buffer 295
5%	Catalyst LO
0.1%	Mykon WA

We can all appreciate, in an abstract way, the advantages of imparting a shrink resistant finish. However, it really produces a striking effect when we compare, side by side, the appearance of garments made from treated and untreated fabric. Both these garments have been subjected to 3 home launderings, and the results are shown in Figure 4.

In conclusion, I would like to say that knitted fabrics have certain inherent advantages in cost, comfort, and style. The market for such fabrics can be greatly increased by appropriate finishing treatments to produce controlled shrinkage, wash-wear, spot-stain resistance, and other desirable properties.

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Irving Feigelstein

BOGART YARN WINDING CO.
20 Bogart Street, Brooklyn 6, N. Y.
HYacinth 7-5220

DAILY FLOW REPORT for W/E 9/26/59

DAY	DEP'T.	PULLOVERS: LOOP NECK	LOOP SHIRT	SEAM SHIRT	VEE NECK	CREW NECK	SLEEVE LESS	NO. TOTAL "A"	COATS: REG. POCKET	VESTS (PKT.)	SHAWL (PKT.)	NO PKT.	TOTAL "B"	A+B DAILY TOTAL
MONDAY	KNITTING		45		60	53	70	228	85	32	42		159	387
	WASHING	DYED			55	60	48	163	80	35	40		155	318
	STEAMING	24	30		45	10	52	161	76	50	38		164	325
	CUTTING	39	30		80	55	60	264	82	25	43		150	414
	SEWING	42	35		50	80	65	272	75	38	45	24	182	454
	PRESSING	35	20		55	72	64	246	78	35	40	35	188	434
	EX., FOLD	37	418		57	70	70	273*	75	33	42	37	187	462*
TUES	KNITTING													
	DAILY TARGETS:	40	30	—	55	70	70	265	80	35	40	—	155	420

Figure 1 SLIDE IV.

Figure 4

chines from one style group to another than it is to change people's skills, or hire them and lay off when work is not available in the sewing department.

In case frequent switching of knitting machines is inconvenient, we can always arrange to store some goods between knitting and the cutting or between the cutting and the sewing departments, as another way of providing the continuity of flow. A planned storage, however, kept at a safe minimum of dozens and not an unmanageable mess. Thus up to the storage area the style-group flow may be intermittent. Beyond, it should be steady at a predetermined daily volume.

Having planned the manufacturing program, we must now see to it that it is carried out according to plan. Each group of styles is like a pipeline passing through the entire plant operation. Each pipeline has to carry an even amount of goods daily and without an interruption. Success will be rewarded by a low inventory of goods in process and a short work cycle. The cost of labor will be low, because employment will be steady with a minimum of job changes.

It is therefore of utmost importance that the flow of each group of styles be reported as to the volume on a daily basis. A weekly report is not good enough, because corrections in flow must be done daily and instantly.

Figure 4 illustrates the type of report we may compile daily. It shows the performance of each basic department in dozens of each group of styles.

In the case of our ribbon cardigans we should knit, wash, steam, cut, sew and press 120 dozens in each department every day. Each departmental supervisor gets his 120 dozens and passes them on to the next department. Since no one has excess of goods from which to choose, a supervisor's job is greatly simplified. He has no choice; there is less room for mistakes.

Of course, at the end of each work week the departmental production figures are summarized—always by style group. We thus get the weekly goods-in-process report and can easily detect fluctuations in inventory.

I have now described the best method I know of running a multi-style sweater plant, any multi-style plant for that matter.

To summarize it we must: (1) Arrange styles by family groups; (2) project the daily volume of flow of each style group, and (3) see to it that each department processes the required volume of each group.

Of course, this approach does not permit sudden and violent switches in production schedules. While it lends itself easily to planned changes—and we can predict weeks ahead what changes should take place, how and when—it is my opinion that sudden changes in planning are largely due to poor management. The end of the season may force us to throw planning out the window, but by that time we should have made our profit.

There is one additional problem to be solved if the production control department is to be in charge of flow, and that is the problem of departmental reporting of the work performed, and recording it.

In the old days of few styles and large volume of each, that task was simple: the manager looked at the floor and saw that the 200 dozens of V-neck pullover of red color were being followed by 150 dozens of the same style in blue color.

This changed years ago when we started washing our goods and, because of the danger of shading, had to accept a wash lot as a production unit. We could not go by color any longer. The condition became worse when bulky goods came into prominence, because a wash lot may now comprise no more than five dozen goods. We have many styles and numerous small production units. We find it difficult to keep track of every one of them.

Thus, in the firm of our example, with a weekly production of 1,200 dozens and 3,600 dozens in process on the floor, we may have to know the location and control the flow of as many as 720 individual units.

I should say that there is a certain advantage in having small production units, especially when there are many styles being processed; small units flow faster and it is easier to manipulate them within the flow.

The location and flow of numerous small production lots can be controlled quite easily by means of visual control boards.

A visual control board is simply a sheet of perforated masonite, a peg board, arranged to give a pictorial view of the plant. It shows the knitting department, subdivided into machine centers and style groups, and on the other side of the board we have the rest of the plant, by departments, again broken down according to style group. Each group and each department has its peg on which we hang small tags, each tag representing a production lot.

The lot is fully identified on the tag and, as the lot moves through the various departments, so the tag is being moved from department to department on the pegs of the board. Each time the tag is moved, the date of completion of the last operation is stamped on it.

Thus, starting at the bottom, we read the style number and the date of issue of the lot to the plant. It belongs to Order No. 015 and the lot is identified by Ticket No. 34. The color of the lot is curry and it is for 20 dozens. The garment requires but one trim and is a merrow collar cardigan produced on the LH knitting machines. It is scheduled for May 1 delivery.

Going up, we see the dates of completion. Thus knitting of cloth was started on April 2, bodies being finished on the 3rd and sleeves on the 4th. The lot was delayed in knitting because, for some reason, the trim was not knit until April 7.

It will be noticed that the tag has room for three trims, in case we need more than one, as in this instance. We then proceed to wash, steam, cut, sew, trim, press and pack the lot, the jobs being completed on the dates shown.

In brief, the tag describes the lot and gives complete time history of its flow. The location of the tag on the control board checks with the actual location

(*Continued on Next Page*)

TIME CHART SLIDE V.

PACK 4/28	
FROM EMBR. 2 V	PRESSED 4/18
TRIM 4/17	TO EMBR. 2 V
FROM DYE HO. V	SEW 2 4/16
SEW 1 4/14	TO DYE HO. V
TO EMBR. 1 V	FROM EMBR. 1 V
CUT TRIM V	CUT CLOTH 4/10
BRUSHED V	SEP. & STEAM 4/9
TO WASH-EXTR. 4/8	DYED, WASH. EXTR. 4/9
FINISH TRIM A 4/7 B C	
FINISH CLOTH BOD. 4/3 SLV. 4/4	
START CLOTH BOD. 4/2 SLV.	
GARM. TYPE M. COLL CUT LH CARDIG	DEL. SCHED. 5/1
NO. OF TRIMS 1	DOZ. ISS. 20 DOZ. CUT 19 1/2
COLOR CURRY	
PROD.# 34	ORDER # 015
STYLE 6940	DATE ISS. 4/1/60

Figure 5

of the lot in the plant.

We come to the board and check the lot tags. We see one that has not moved for four days. We call up the supervisor and ask him to process the goods immediately, or find out why they have stopped flowing.

We do not control every production lot but only the ones that behave badly in getting stranded. Not someone's memory but the dates tell us that.

A visual control board is useful in a firm making swim suits. The colors denote, of course, the different delivery periods. The horizontal rows show the style-group arrangement, and the vertical columns indicate the different departments through which the lots have to pass on their way to completion.

The board tells a simple, impersonal story, and it tells it not only to the production control clerk, or the plant manager; it tells the same facts to a busy owner, or general manager, who wants to see at a glance, without involved and laborious reports, how the plant is doing. It tells him:

1. Which lots and orders are delayed.

2. How long they have been in the delaying departments.

3. An accumulation of tickets in one department in any group of styles tells him of a bottleneck in that department.

4. Uneven distribution of tags on the pegs of one style-group indicates expensive peaks and valleys in the distribution of goods.

Last, deliveries to stock of lots, colors and orders can be forecast directly from the board or simply speeded up to completion without guesswork.

I believe the visual control boards to be indispensable tools of planning and control in larger plants making many diverse styles at the same time.

Another illustration of control by visual means is the yarn visual control board.

Horizontal lines represent the different types of yarn in use by the firm. Vertical columns represent the various colors used by the firm. Each tag represents one case of yarn. Cases are identified by three colors:

1. White, as received from the spinner or dyer;

2. Blue, backwound yarn, available for immediate knitting, and

3. Pink, yarn returned from knitting as excess, repacked and put back into stock.

The advantages of such an approach to inventory control are obvious. Just by glancing at the board we ascertain what colors are in the house, available for knitting and whether the yarn is backwound or not. Pink tags stick out like the proverbial sore thumb, indicating part cases and odd cases which should be used up as soon as possible. Simple. No need to go through hundreds of inventory cards, voluminous book records or to remember odd lots cluttering up the yarn stock room.

The supervisors report their production in the simplest possible way. Each production lot is described in detail on a manufacturing ticket, a section of which is detached and hung up on the visual control board. The manufacturing ticket travels through the plant with the lot of goods it describes. When work on a given production lot is finished the supervisor detaches a perforated stub from the manufacturing ticket and pastes it onto a gummed sheet, the same as any sewing room piece worker does. At the end of a working day he returns his gummed production sheet to the production control office. The latter stamps the movement of lots onto the lot tags and moves the tags to their new positions on the visual board.

A typical example of a manufacturing ticket is shown in Figure 6.

You may question the size of the ticket, or its complicated appearance. Please bear in mind that the ticket performs many necessary functions:

1. It is an order to the plant to manufacture a certain style in a certain color and yarn in a specified breakdown of sizes.

2. It is a style and order specification form, giving technical information as to yarns, washing formula, steaming sizes, the types of findings to be used and the method of packing the goods. It may also specify the finished garment measurements.

2. It is a style and order specification form, giving technical information as to yarns, washing formula, steaming sizes, the types of findings to be used and the method of packing the goods. It may also specify the finished garment measurements.

3. The form gives exact knitting instructions as to the number of pieces per strip and the number of strips needed. It specifies how many knitting bundles the lot is to be arranged into.

4. It is an inventory and weight control form, the weight being registered both by size and by the entire lot.

5. Since operations from knitting through to the lay-up of goods are fairly standard in type and sequence, the ticket is used for piece work rate payment purposes in this part of the plant, or, at least, as a record of operators' productivity. You see the perforated piece work rate stubs on the right side of the ticket. In the cutting department, when the cloth has been converted from strips, or yards, into dozens, a sewing bundle ticket is attached to each bundle and the production ticket then becomes a route card and a specification card.

6. Along the left hand side of the ticket are the progress report stubs covering every route the lot may follow.

7. The ticket has room for a cutting record and also for a shipping, or packing record. In brief, the ticket should contain all the information helpful to the people in the plant and accumulate the entire history of the lot and style for weight and cost experience purposes.

8. Lastly, on the back of the ticket we find the listing of all the sewing bundle numbers, their sizes and quantities. It is here that firsts, seconds and fallouts

(*Continued on Page* 37)

SLIDE VIII
PRODUCTION TICKET
XYZ
STYLE: 6940
WHITE
BLACK
RED
LOFTY
100% M.
L-H. 1/2 CARNG.
3/4 SLEEVE
SEAM COLLAR
CARDIGAN
TIE
WHITE PEARL
PATTERN # 6956, 6956
WEIGHTS: CLOTH 114#, TRIM 12 6 3, ORDER TOTAL LBS. 129 14
WASH FORMULA: B-3
WHITE-Black-Red
KNIT BODIES
KNIT SLEEVES
SIZES 8 10 12 14
DOZ'S. TO CUT 5 5 5 5
TOTAL DOZENS BOXED 20 20 20 20
STRIPS OR ACCOUNT FOR ALL BUNDLED KNIT 15½ 15½ 16½ 16½ 12½ 13 12½ 13½
Size of Spreader 38 38 42 42 40 40 44 44
PART COLOR SIZE BLEND LOT # SPEC. INSTR.
Body WHITE 2/17 M 4315 NONE
Coll WH-BLK-R. 2/17 M
Tie BLACK M
TRIM DESCR. A JACQ. COLLAR B TUBULAR TIE C VOID
TRIM TICKET STYLE 6940 ORDER # 015
TOTAL DOZ. BIN # 20
STYLE 6940 ORDER # 015 10-BAN 1-1 RIB
WHITE 4315 20
BLACK 2110 20
RED 819 12
STYLE 6940 ORDER # 015 STRIPE JERSEY 12 CUT
BLACK 2110 20 3
STYLE VOID ORDER #
TRIM A KNIT STYLE 6940
TRIM A TUBULAR STYLE
TRIM B KNIT STYLE 6940
TRIM B TUBULAR STYLE
TRIM C KNIT STYLE
TRIM C TUBULAR STYLE

Figure 6

Daniel R. Strauss

President
Himalaya Knitwear Co., Inc.
Originators of Aussie Brook Knitted Leisurewear.

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Paper Yarn For Knitted End-Uses

(*Continued from Page* 17)

ribbon width that can be economically handled. This has an important bearing on the yarn size. Furthermore, the narrower this width of ribbon, the smaller the diameter of the resulting wafer must be, since it becomes increasingly difficult to handle large diameter wafers of narrow ribbon width. The problem here involves the telescoping of the core of the wafer and its subsequent collapse if it is not handled with care. This limitation creates a secondary difficulty, in that in necessitating the use of smaller wafer diameters, more frequent splices in the ribbon or knot in the yarn are required. These can be a source of trouble in knitting. However, it would appear that these difficulties might be overcome by designing a ribbon reel—not unlike those used in a movie projector on which large diameter narrow width ribbons could be wound.

A second method to produce paper yarns involves a patented technique wherein the yarn is made from the original paper roll in one continuous process without intermediate steps. This method consists in taking a paper roll of specified dimension, running the sheet through a bank of slitters, and then taking the individual ribbons past a common moistening roll to individual twisting heads of a multi-spindle twister. This eliminates completely the wafer stage mentioned above. This method makes possible the processing of light paper weights on a narrow ribbon basis, and suggests a good and efficient approach to the manufacture of light weight paper yarns. In a vertical arrangement, the bobbins may be taken from the twister and mounted directly on the knitting machine. With this method, ribbon widths of approximately ⅛-inch and paper weights of about 14 lb. weight are now undergoing successful experimentation.

In addition to improved methods for the manufacture of paper yarns, other developments in paper technology bear close watching.

NKOA Convention Proceedings

Developments In Napped And Sheared Interlock Knits

By KENNETH D. HOUSER
Textile Fibers Department, Du Pont Co.

THE NAPPED and sheared concept for interlock sweaters of Orlon acrylic fiber was introduced to the knitting industry at the Du Pont Knitters Conference, February 11, 1958. This finish had been successfully produced on interlock sweaters in Europe for several years, and Du Pont felt this finishing technique warranted further development for our domestic producers. The luxuriously soft handle and high degree of resistance to surface distortion, combined with the already well known advantages of Orlon, created immediate interest.

Many knitters immediately initiated programs to include the napped and sheared interlock in their lines. The rapid growth, however, was restricted because of the limited number of dyers and finishers equipped to do a satisfactory job. Few, if any, of the sweater dyers had suitable nappers or shearers, as most of this equipment historically was located in woolen finishing mills and in mills finishing pile liner fabrics.

Many of you recognized the potential growth of napped and sheared interlocks of Orlon and, with the help of Du Pont, made arrangements for commission finishing or purchasing the necessary equipment. Today, this production is rapidly increasing, with several commission finishers and integrated mills turning out considerable poundages of high quality fabrics.

We feel that growth in this area will continue, but only with concerted effort on quality. The prime factors affecting quality which can be controlled by the knitter are yarn selection and construction. Selecting the optimum yarn for a given construction is important, as twist, count, and spin system greatly affect the type of finish which is subsequently produced. The twist determines how easily and successfully a fabric can be napped; it must be low enough to allow the fibers to be lifted out by the napper wire. High twist resists the lifting action and produces a very lean and irregular surface. Therefore, we recommend using the lowest twist multiplier consistent with good spinning and knitting.

By the same token, a very erratic surface will result from the use of uneven yarns. The twist of uneven yarns usually runs into or increases in the thin segments while it backs off from the thicker, more bulky sections. This variation in twist throughout the yarn results in under- and over-napped areas, since the greatest nap is produced in the lowest twist areas where the bulk is the greatest.

The yarn count should be selected to give a full-bodied fabric and one which will produce adequate surface cover. Too fine a yarn in an open construction will not produce a smooth uniform surface texture which will appear lean and undernapped.

The spinning system has a very definite effect on the ability of the finisher to produce the desired surface texture in the finished fabric. There are three common types of yarns used in interlock constructions. The cotton spun yarn containing regular shrink staple has a high degree of fiber parallelism and produces a relatively smooth yarn which is difficult for the napper wires to penetrate and lift the fibers out to form the plushy surface. The second yarn is a cotton system high-bulk yarn from cut staple and has a looped condition which will allow more fibers to be brought to the surface. This yarn is better than regular cotton spun yarn, since it has a greater number of looped fibers on the surface. The Turbo Stapler high-bulk yarn and the high-bulk cotton spun are recommended as they are napped easily to produce the desired and uniform density of raised fibers or bottom cover. Final yarn selection and fabric construction should be based on the needs of the knitter's particular equipment and the finished texture desired.

A wide variety of fabrics have already been produced successfully for this important new style trend. However, I would like to point out certain areas which are potential trouble spots for the finishers. The first is the cuff or waistband. Many mills adjust their stitch to produce a ribbed cuff, narrower than the body of the sweater blank, for greater elasticity in the cuff. During the napping operations, high wale tensions often cause the wider slack body sections to fold over, resulting in an unnapped streak running the length of the sweater blank. If this problem exists, it can be corrected by knitting the band closer to body width.

The second area of potential difficulty is the drawthread. This thread must remain intact throughout the dyeing and finishing operations to the cut-and-sew stage. During the napping and shearing, the drawthread is subjected to considerable punishment and must be able to complete the process without breaking, hooking, or fraying. The drawthread should be knitted so that it does not appear on the surface and produces a minimum distance between the blanks or sweater bodies. A double drawthread of Du Pont nylon does a very good job.

The transfer welt is the greatest potential source of difficulty during napping and shearing interlock sweater-blanks. The welt must be designed with a minimum number of cast-off courses, as excess bulk prevents or interrupts close shearing continuity along the strip. Complete and uniform shearing is not realized, nor is it practical when the shear blade must be raised at each junction to allow passage of an excessively bulky welt. Superfluous cast-offs are hooked by the wire rolls and are raveled very badly during napping. Such a condition increases the possibility of body separations during processing, resulting in damaged fabrics as well as reduced machine efficiency due to roll wraps.

We point out these problems and pitfalls so that corrective measures can be used as aids by knitters to produce top quality fabrics and garments. Emphasis must be placed on quality and good styling, with continued effort being applied at every processing step to ensure strong consumer demand for napped and sheared interlocks. As you all know, Du Pont is very quality-conscious and conducts a never-ending search for methods for producing better top quality fibers. We also maintain large technical service and marketing groups which stand ready to assist you with your problems from yarn selection to marketing.

During the past two years, since its introduction, considerable poundages of napped and sheared interlocks have been produced. We feel that tremendous growth potential still remains for these fabrics in the women's wear field. The areas of men's wear and children's wear remain almost untapped to date and offer unlimited opportunities with a little styling ingenuity. The napped and sheared interlock of Orlon acrylic fiber has given new impetus to the interlock fabric with its excellent aesthetics and performance characteristics. We have the whitest whites; we have the brightest and clearest shades; we have the fastest colors; and with the proper fiber selection, we have the aesthetics that are desirable and pleasing to the consumer. These attributes, combined with the current popularity of textured surfaces, create renewed consumer appeal.

In the textile field, new fibers, fabrics, textures, and colors must continually be developed to attract the consumer's attention and whet his appetite for your product. These developments must be functionally sound and not merely gimmicks if they are to attract and hold the consumer's attention. We feel that attention should now be focused on new developments to insure the continued success of the napped and sheared sweaters and fabrics of Orlon.

We have a few new techniques which show merit and warrant further development. The first such technique for im-

(*Continued on Page* 39)

NKOA Convention Proceedings

Quality Control Procedure In Knitted Outerwear

By BERTRAND FRANK
Bertrand Frank Associates

THE PRINCIPAL objectives of the quality control plan developed by us for your association are two-fold: (1) to obtain for your customers the quality level they have come to expect at a low and practical manufacturing cost and (2) to minimize the expenses of repairs, rework, seconds and inspection. The plan has been detailed for you in a, "Practical Program for Quality Control," copies of which can be obtained from your association office. It has been instituted with success not only in the knitted and swimwear industry but in other industries as well. The program is the result of actual mill experience. It involves no statistics and is easy to install.

Specific points may be altered to tailor the plan to the particular company, but in the main it varies only moderately from plant to plant.

Procedure

The first step is to decide if you have a quality situation that you should correct. To find this out we suggest a warehouse audit of the finished stock you have ready for shipment. Perform a sampling inspection of every twentieth or hundredth outgoing item and determine its quality. If the percentage runs to 12 percent, 15 percent, or 20 percent, as it has in some plants with whom we began work you definitely have a problem.

The next step is to obtain candidates for a quality control inspection staff. About two inspectors per 100 operators normally is a conservative result of balancing economy and satisfactory coverage. The people can be chosen from almost anywhere in the plant, are interviewed and then placed in the final inspection department for a training period.

Now you come to a more difficult phase in which you, the owners and managers, must make your contribution. You must decide what is a defect and how many defective garments you will accept out of each one hundred that are inspected. Most plants strive for five percent defective but we have brought some plants down to three percent.

The information defining defects is used as a specification sheet for the inspectors. It tells exactly what is acceptable and what is not. For example:

Arm seam and side seam not acceptable if off more than ¼".

Buttons on solid color garments acceptable if variation is no more than ⅛" from center line.

Sampling

Next establish your sampling plan. How many garments per dozen will you inspect? Where will you locate the sampling inspection points? Many plants inspect two garments per dozen for previous workmanship and do this after a tricky operation or after seaming which would be difficult to repair later on. Work places and reporting forms can be as simple or as elaborate as you wish.

You will note that the Practical Program for Quality Control is just that, practical. The plan is devoid of statistics other than the calculating of a few simple percentages. (The program uses simple tables instead.) Our study of many plants has shown that when statistical quality control is employed the accent too easily shifts from the improvement of the product to the administration of a complex and, for this industry, doubtful quality plan. We have avoided that. The program has proven to be straightforward, easy to install and yet effective.

The inspectors roam from station to station sampling bundles at random at the points you previously have designated. Any

(*Continued on Next Page*)

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bad work they find is returned by the supervisor to the operator for her repair. Contact between the quality control inspectors and the operators should be kept to a minimum to avoid friction.

You can check the effectiveness of your quality control program by taking periodic warehouse audits to verify the continuing low defect percentage.

The program, in installation after installation, has quickly repaid its cost. It cuts down on repair costs, allows for a reduction of the final inspection department and truly improves the quality of the garments you ship to your customers.

Production Control In Knitting Mills

(*Continued from Page* 33)

may be recorded.

Because a large plant may handle many hundreds of tickets, or even a thousand, or more, the job of filling in the information would be stupendous, if done by hand. We print them on the duplicating equipment, such as Ditto, from masters prepared for specific styles or for specific styles-orders. When tickets are printed, the job of preparing them becomes a minor part time assignment.

Aside from providing the supervisors with all the necessary technical information, the production tickets perform another function; they serve as a handy inventory. When a lot arrives in a department the production ticket is placed on the foreman's desk in a file, according to the style-group, or it may be hung on a departmental production board. The foreman then knows at a glance what types of goods are on his floor, and specifically, what styles and in what quantities. He can pick the required orders without searching through trucks, or cartons.

When a production ticket has completed its cycle in the packing department and the quantities packed in the various sizes have been entered on it, the ticket is returned to the production control office for scrutiny and filing.

Our plants are too large and too complicated these days to be controlled by many individual supervisors. We need production planning and control procedures tailored to our individual needs.

Creslan's Role In Knitwear Trade

(*Continued from Page* 7)

laboratory in New York City.

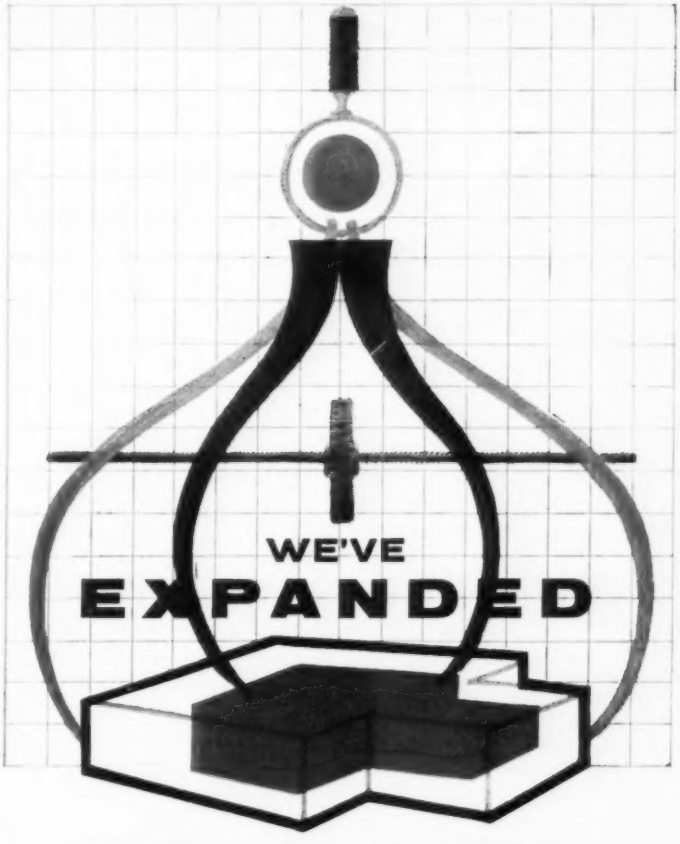
In addition, the fibers division of American Cyanamid Company recently opened a fiber applications laboratory and technical service center at the company's Bound Brook plant in New Jersey. This new center will provide processing equipment for coarse through fine gauge knitting, both circular and full fashion, plus equipment for dyeing and finishing.

The primary aim in gearing up our marketing organization with creative people and knitting facilities to serve the knit goods industry is to reduce the amount of time required to translate new fashion concepts into profitable merchandise with consumer appeals.

We at Cyanamid have long recognized that an outstanding fiber such as Creslan, in appealing garments, requires dynamic, but balanced marketing plans, including strong advertising and promotion programs.

To assist the manufacturer to achieve his profit potential, we have developed a unique quality and trademark control system. Under this program, the fiber we make is sold under the label "Cyanamid acrylic fiber," not under the trademark "Creslan." Rights to the name Creslan are reserved for use only on those fabrics which meet clearly defined standards of performance and quality established by Cyanamid with the manufacturer. There are obvious great advantages to this approach in making Creslan a quality symbol to work for your profit in finished knit fashions.

Another phase of our overall marketing program is advertising and promotion. While I will not emphasize this phase unduly here, I do wish to draw your attention to our continuing heavy schedule for manufacturers' fashions containing Creslan in Life Magazine and in men's and women's fashion magazines. Also included in the program is support for national advertising through local newspapers, Sunday supplements, radio and spot television, and a strong schedule of trade advertising. Behind the program, too, are trade and consumer publicity.



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Serving the Knitted Outerwear Industry

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Lamination Of Knit Yardgoods

(*Continued from Page* 23)

with our new Reevellure finish. This finish is related to a silicone type and when applied to woven cotton outerwear fabrics provides wonderful advantages of crease resistance, water repellancy—and brings out a magnificent bloom in the intense colors especially the reds and the blacks.

Another problem we have been having is the excessive shrinkage of laminated bulky cotton knits when washed. These should not be sold as washable. To overcome this problem many mills are now making blends of cottons with high percentages of Orlon and nylon.

In any event, I can assure you that the foam I represent is as washable as the fabric to which it is bonded. It is also completely dry cleanable and will absolutely not separate or deteriorate.

Because foam permits the use of lighter weight fabrics in outerwear, it also opens up new selling areas to mills and cutters. It is now possible to use the same fabric on two items. A knitted sport shirt—unlaminated—can now be coordinated with a matching jacket which has been laminated to foam.

This helps both mill and cutter. The mill doubles the use of its fabric. The manufacturer can make two items from the same goods which is helpful in its inventory.

I believe you will be interested to know that our business with the knitted outerwear industry, which was non-existant only a few years ago, grew to several million yards by last year. For 1960 our projections indicate the volume will triple and next year will redouble again.

The leading brand name foam producers are right now engaged in very strong public relations and educational programs. In my own company's case, for example, our publicity agency is currently making hundreds of personal calls on all the leading merchandise managers and buyers in the leading stores, mail order firms, buying offices as well as the fabric editors of every leading fashion magazine, the women's service magazines.

Improvements In Du Pont Fibers

(*Continued from Page* 11)

even better quality yarns than possible with the older merge.

In addition to improvements to Orlon staple fibers, all Orlon tow is being shipped in continuous form without splices or knots. This means increased efficiency for Turbo yarn spinners as well as fewer quality defects resulting from Turbo machine stops due to tow splices or knots in tow cartons.

The most recent addition to the family of Orlon is Orlon Sayelle bi-component acrylic fiber. This product was introduced as a staple fiber of uniform cut length. Extensive testing has revealed that an outstanding improvement in yarn and fabric quality can be achieved with a variable cut Orlon Sayelle staple fiber. Improved yarn uniformity, more uniform twist distribution, more uniform bulking and garment appearance have been reported for this product.

Now turning to nylon, last month the Du Pont Company introduced to the trade a new, improved continuous filament nylon yarn engineered specifically for use on commercial texturing equipment. This yarn, known as nylon Type 288, has characteristics which make it ideally suited for processing over a wide range of texturing conditions. We believe that this flexibility in texturing conditions is a significant contribution to your industry. Textured yarns of nylon Type 288 have greater bulk, stretch and recovery properties than textured yarns of our regular nylon yarn Type 200. Knit fabrics prepared from this new yarn are noted for their excellent uniformity of both bulk and dyeability. Presently, only limited quantities of this new yarn are available. However, because of your interest in Type 288, manufacturing facilities are being expanded to provide the trade with an adequate supply of this new yarn.

In summary, the entire program of fiber improvements is the direct result of the key information as to the needs and deficiencies of our existing fibers as they are relayed to us by you of the knitting industry who are the final judge of our product's quality and processability.

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Use Of Vyrene In Elastic Fabrics

(*Continued from Page* 13)

thread.

Aside from the luxury market, we also believe that volume business can be developed with this new material. Resistance to dry-cleaning makes practical the use of elastic fabric in sportswear such as windbreaker jackets, ski-suits and golfer's apparel. Men's suitings are currently being evaluated. Women's wear could prove a completely new field. We believe that dress goods and suitings can be improved through the incorpration of moderate amounts of Vyrene thread.

Vyrene is used for the production of Lastex yarn as a core material in the usual variety of styles. In general, however, the policy has been to supply Lastex with Vyrene core to only those applications having special requirements not completely fulfilled with rubber core. At the present time, Vyrene costs substantially more than rubber thread, so that it is merely good business to confine its use to applications where it can earn its way. For example, it is entirely possible that Vyrene would be worthwhile in an application requiring extremely long life and exposure to some of the elements that affect rubber. Another example would be sheer fabrics that have as a requirement extremely high modulus. Another example would involve the use of a very small amount of Vyrene thread to provide low modulus fabric for form-fitting applications. This would be especially true for garments where dry-cleaning was involved as a factor.

Vyrene is also used as the core material in our new textured Lastex yarn construction. This yarn consists of Vyrene core provided with a loose spiral wrapping of nylon. This new yarn, handled in the stretched position, performs very satisfactorily in looms. As a knitting yarn, it also lends a desirable soft hand to the fabric.

Research and development work in Vyrene has extended over a period of ten years, and during the last two years the pilot plant operation has been on a continuous basis. Recently, a production unit was put on the line, and is now producing on a continuous basis.

At present quantities are limited and this material is being channeled to applications that take full advantage of the desirable properties of the product. We are, of course, expanding our facilities as rapidly as possible and our technical and sales service staff is working very closely with customers in many trades to develop sound and successful uses for this promising fiber.

Napped And Sheared Interlock Knits

(*Continued from Page* 35)

proved styling is the use of blends of Orlon and wool for cross-dye effects and heathers. The yarn spinners have a ready supply of yarns of 80 percent Orlon and 20 percent wool which can be cross-dyed in a range of shades. Either of the fibers can be dyed while the other is reserved to give special effects. Speaking of special effects with piece dyeing color-sealed black Orlon acrylic fiber as one component of the blend should not be overlooked. Utilizing color-sealed black Orlon with natural Orlon to achieve cross-dyeings produces a two-color piece dyeing 100 percent Orlon. You can see readily what diversification can be achieved by using some of the yarns now in current production. These fabrics can be color-keyed as coordinates or matchmates.

A more elaborate display of color is achieved by using tow-dyed yarns in a jacquard machine. Variations in color and pattern can produce unlimited effects. While discussing the use of the jacquard machine, I would like to suggest for your development a very novel approach for variations in surface texture. Since the twist level of the yarn has a direct bearing on the amount of surface fiber raised by the napper, yarns of distinctly different twist levels could be knit in a prescribed pattern on the jacquard machine. After napping and shearing, a three-dimensional effect should develop. This method affords the most versatility for sweater bodies, where the bands

(*Continued on Next Page*)

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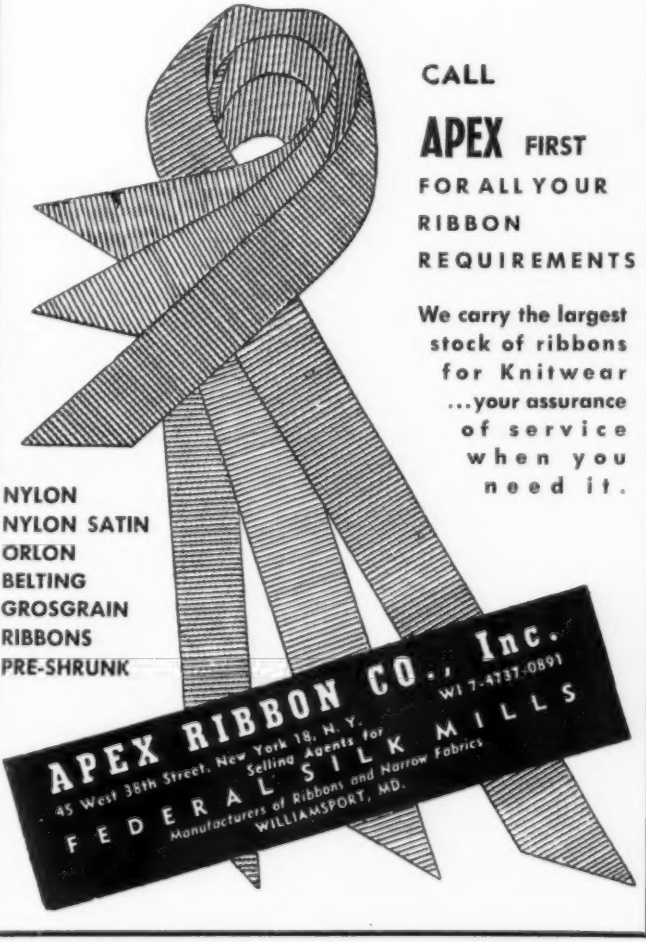

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or cuffs would remain plain in surface texture.

Three-dimensional textures can also be developed by embossing after the napping and shearing. However, pattern limitations would be a problem. If sweater-strips were processed, the cuff or waistband would also be embossed the same as the body and could detract from the unique styling. An alternative, however, would be to sew on a separate band of any desired weight, texture, or color.

Another old and practiced art for producing a three-dimensional effect is pattern shearing. The fabrics are prepared and finished in a conventional manner to include a smooth, uniformly sheared pile height. A final shearing is made on a pattern shear, where the pile is cut at various heights to achieve the sculptured texture. Full pile density is paramount for this technique to show the contrast in the sculptured portions.

Another development which offers a high degree of versatility in design and styling is the interlock yard goods of Orlon acrylic fiber. All of the previous suggestions could well be incorporated into this fabric for a completely diversified line. By selecting the correct machine, yarn and construction, changes can be made to produce garments from lightweight blouses to heavy outerwear such as jackets and coats.

The continental sweater vest with the look of Italian suede is another style item increasing in popularity. It can be produced with 100 percent Orlon on a fine-gauge interlock machine and given a napped and sheared finish. Using the correct yarn with a loose stitch the napped and sheared finish will give the handle a fine cashmere-like effect.

Good engineering is demonstrated in the swim suit cut by M. & M. Knitting Mills from the fabric produced at Manchester Knitted Fashions. It offers the clear bright shades, good fastness, softness of hand, and quick-drying properties needed in this end use.

These garments will give you some idea of the design and styling versatility possible with interlock yard goods when combined with the excellent performance and aesthetic characteristics of the napped and sheared concept.

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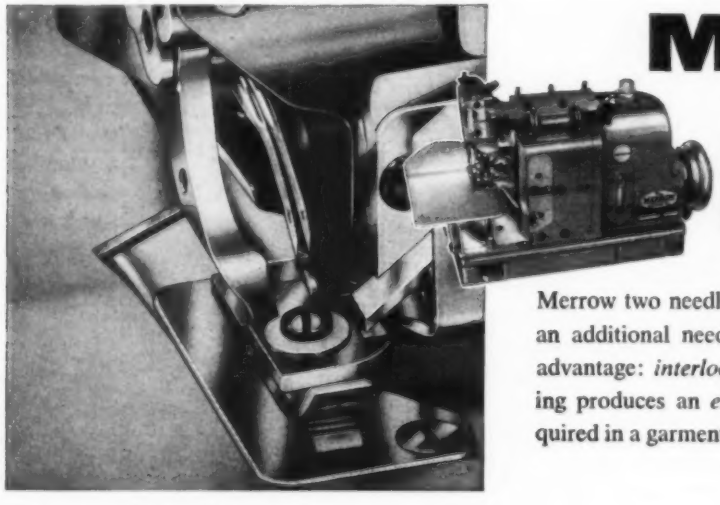

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New Techniques In Marketing Of Fiber

(*Continued from Page 9*)

Another phase of our effort is promotion. One program at retail right now was kind of fun to create, and it will give you a feeling for the job we are doing at the local level. Appropriately, it is titled, "The Fun Is in the Wearing," and we are working with 15 department stores across the country. Store customers are asked to write their reasons for liking sweaters and sport shirts of Orlon. The winners will get a couple of sweaters and sport shirts plus the use of a "Jeep Surrey Fun Wagon" for a weekend.

A new technique at retail is the use of local Sunday supplements in a number of markets. One big advantage of them is that they give us and the stores maximum flexibility.

An important part of our program is to get the sweater story to the retailer. We use many techniques to accomplish this job. You are familiar with our trade advertising. Another technique that accomplishes the same objective is the issuance of buying guides to retailers before the tweaters come into market.

Finally, one of the most important things that we both have working for sweaters of Orlon at retail is Du Pont's new retail field force.

James Nields Reelected President Of Association

(*Continued from Page 1*)

ting Mills, Philadelphia; and Arthur Lichtenstein, Franklin Sweater Mills, Philadelphia.

Cleveland District: Richard Fishel, Standard Knitting Mills, Cleveland; Alex L. Siegel, Lampl Fashions, Inc., Cleveland; Marc Frisch, Frisch Knitting Mills, Cleveland; Alan M. Loveman, Bradley Knitwear, Cleveland; and Norman Faigus, Excelsior Knitting Mills, Cleveland.

Western District: James Kemper, Kemper Knitting Mills, Chicago; Don Michelstetter, Imperial Knitting Mills, Milwaukee, Wis.; Kenneth Newberger, Royal Knitting Mills, Chicago; G. W. Rogers, Eagle Knitting Mills, Milwaukee; and Sam Straus, Straus Knitting Mills, St. Paul, Minn.

Frank M. Titelman, The Puritan Sportswear Corp., Altoona, Pa., director at large.

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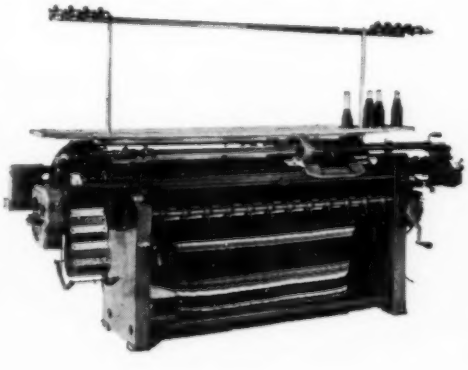

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First among "Orlon"* tow-dyed spinners
*DuPont's acrylic fiber
The French Worsted Company
and Dauray Textiles Division
Woonsocket, Rhode Island

Annual Survey Of The Industry

(*Continued from Page* 5)

The figures reflecting the Japanese exports used in Table II are the official release of the Japanese Government. Unfortunately, they do not offer breakdowns showing the portion entirely of wool and that consisting of blends, so as to make possible an exact comparison. But in either case it will be seen that the Japanese have succeeded in occupying a very substantial portion of the wool full-fashioned sweater market. Moreover, even in the absence of such a breakdown of Japanese exports, it is noteworthy that the Japanese Government quota for exports to the United States consisting entirely of wool (according to its most recent explanation) is in excess of the total domestic production of full - fashioned sweaters made entirely of wool. The Japanese quota on exports to the United States and Canada is 260,000 a year.

All of this is quite in contrast to the rather trivial proportion attributed to imports from Japan when they are compared to total sweaters in all categories produced in the United States, including infants', children's and other types, which the Japanese do not export at all.

A further consideration in these statistical comparisons is this: A significant change has occured in the character of full-fashioned sweaters during the last few years. They have become far more highly styled and diversified than ever before. Anyone familiar with the industry will agree that the tendency has been to retreat from the classic types of wool full-fashioned cardigan and slipover. The price advantage of the Japanese product, which is virtually all classic, is too great to contest this area. The survival of full-fashioned production in wool and such minor gains as it may have made in comparison to the industry's expansion has probably been dependent solely on the adoption of novelty design and the abandonment of staple types. Were it possible to compare the domestic production of all full-fashioned staple goods in chief value of wool with the Japanese imports, I venture to say that we would find the share of the field possessed by the Japanese exported to be striking. Two further points deserve comment on this subject:

Imports from the United Kingdom have fallen off significantly since 1955. Import figures expressed in dozens are not available. United States Customs reports pounds of imports. Assuming roughly an average of five pounds to the dozen, sweaters entering our ports from the United Kingdom in 1955 amounted to 61,505 dozen; in 1956, 58,812; 1957, 52,800; 1958, 34,966; and last year, 34,836. Most of these were probably cashmere.

Further, the cashmere trend in full-fashioned goods showed a similar decline in the United States in this interval, although a slight domestic increase appeared in 1959. The domestic figures are: 1955 — 332,000 dozen; 1956 — 446,000 dozen; 1957 — 333,000 dozen; 1958 — 269,000 dozen; and 1959 — 294,000 dozen.

Although the decline in cashmere may be attributed to a number of factors, there can be no doubt that the first appearance of Japanese cashmeres in 1954 and 1955 was a major contributing cause to the downturn in this area of the industry. There is danger that the same consequence will follow from Japanese entry into the field of fur blends. And that is why the appearance on the domestic market of Japanese sweaters made of acrylic fibers produced in Japan has aroused the apprehension of domestic producers.

Japanese Government Sweater Policy

The industry's anxiety over Japanese imports was also stirred recently by the apparent disregard on the part of the Japanese Government of its own self-imposed quota on sweater exports. According to Japanese announcement in 1957, the maximum quantity of wool sweaters to be licensed for export to the United States and Canadian markets in any calendar year was to be 260,000 dozen. Although this was just about as much as the Japanese had up to that point ever shipped into this market and there

(*Continued on Next Page*)

was some protest here that it was too high, the announcement encouraged the view that the Japanese at least were ready to impose some reasonable restraint upon their exporters, that limitations in the supply would tend to elevate their unnecessarily low prices and that our industry might thus avoid destructive consequences of excessive imports.

These expectations were shaken, when the Japanese Government in 1959, by its own figures, licensed for export nearly 300,000 dozen wool sweaters to the United States alone, apart from whatever additional quantities may have been shipped to Canada.

To meet the situation, the Association conferred with the State Department officials and arranged, through our Embassy in Tokyo, to present the Japanese Government with a request for information explaining and clarifying the sweater export policy. The questions were specific and were framed to elicit specific answers. Several months elapsed, during which we withheld public announcement of these facts in order first to accord the Japanese Government the courtesy of a full opportunity to respond before making our inquiries public. In view of the time that has passed, it is now necessary to report, disquieting though it be, that the inquiries have for the most part been ignored and the quota policy of the Japanese Government remains largely unexplained.

According to the meager information transmitted to us, the Japanese quota, despite the impression created upon American firms and even Japanese exporters, applies only to sweaters made entirely of wool, whereas the monthly totals of sweater exports officially announced in Tokyo cover both wool and wool blends. Why the Japanese Government should announce figures that are unrelated to its quota and why it should withhold figures on monthly shipments coming under its quota remain unexplained. Our repeated inquiries on these points have been ignored like other inquiries.

It is recognized, of course, that the Japanese quota announcement is wholly unilateral. The Japanese Government is free to modify that policy as it pleases. But good faith is, of course, the basis for all trade, and it can hardly advance Japanese-American relations when official export figures issued by the Japanese Government and assumed by the world to be related to the Japanese announced quota, it now develops, have nothing to do with the quota, and true figures are withheld from publication. Those responsible for this policy in Tokyo can hardly be said to inspire confidence in the reasonableness of Japanese trade policy in this area. It is hoped that that policy will be reconsidered and a fresh view taken and recognition given to the desirability not only of setting reasonable limits on wool exports, open to public view, but to take similar measures to allay fears provoked by the appearance of acrylic knitted outerwear.

The Problem of Diversified Production

The two trends already adverted to—the immense increase in the diversity of garment styling and the broader spectrum of fibers and yarns employed — have created obvious problems for production management. It is axiomatic, of course, that the most efficient production is possible when there is volume production of relatively few numbers. The knitting mill manager during the past few years has found himself faced with shorter production runs on a more diversified line.

The problem is more complicated than mere change-overs from one type of production to another, although that is serious enough. It involves greater risk than before in yarn inventories. Also, it raises serious problems in advance planning. In the days when staple classics represented three-quarters or so of the industry's sweater output, the risks of advance production were minor compared to the hazards today. With style diversity, advance production is more difficult. It involves too much guessing as to what form demand will take. Moreover, it requires so much time for demand to crystallize and for preferences to settle that more production must be crowded into a shorter period closer to the point

(*Continued on Next Page*)

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of delivery. Not only production problems, but financing problems and other problems of seasonality are thus intensified.

To help meet these difficulties, the Association is embarking upon a new special study attempting to develop an improved scientific method for better coordinating production with sales, analyzing such matters as the grouping of orders, their sequence, and the selecting of types for production at particular times, the shortening of the production cycle, and other related matters.

The problem is complex. It is not to be expected that a simple solution will provide the key. But in this matter, as in others, the Association has attempted to make the industry aware of the shifts of conditions, of the challenges they raise, and it has further attempted to stimulate constructive thinking and by means of these research projects to help pioneer the way toward improved production method.

This has always been our objective. With the help of the officers, directors and all the committeemen, we hope to come a little closer to achieving it. In reviewing the past year, I am moved to express my gratitude to James Nields for his never-failing help and thoughtful guidance, which have made my relations with him a consistant source of pleasure, to Irving Saltzman for his constancy and devotion to his job as treasurer; and to all of you who have made this year one of gratifying progress.

Fiber Developments For Knitted Apparel

(*Continued from Page* 11)

as you see, no discontinuity between the two co-spun elements, merged as they are from solvent solutions during spinning. This point is important, as any weakness at the jointure could allow fiber splitting as crimping forces take hold. No such splitting occurs in practice with the product.

What does the self-recrimping action of the fiber do in yarns and fabrics? The next slide shows identical as-spun counts of yarns spun from Orlon Sayelle and regular Orlon. As finished by skein boiling and drying, the Orlon Sayelle has bulked up something over 20 percent more than the regular staple yarns. Regular high-low shrink Orlon acrylic yarns in such a test would bulk moderately less than the newer product. The new fiber, of course, does not depend on high-low shrinkage processing and blending for lofting.

This cross section of experimental fabrics brings out the fabric bulking effect which can be obtained. We show magnified cross sections of gray and finished fabrics of identical gray-yarn and end-counts. Dut to inherent fiber crimping force, the in-fabric yarn bundles in the case of Orlon Sayelle acrylic fiber inflate, giving thicker, airier finished structures than given by either regular Orlon or the animal-effect control.

The inventions needed to impart to Orlon the behavior of animal-fiber crimp grew out of work by a research team at Benger Laboratory, Waynesboro, Va., largely under the directorship of Emerson A. Tippetts. The development was a fully directed one made to meet an apparent styling need.

Now why was such a major research effort in this live-crimp area important for wider styling goals in knits? The answer is that crimp behavior has long been known inside and outside Du Pont as a key opportunity to gain new aesthetic standards in certain ranges of fabrics. Animal fibers—in contrast to synthetics — substantially recover crimp lost to tensions in yarn and fabric processing. Recovery occurs through a live, memory-like action in fabric finishing, leading to the familiar effects of elasticity, compressional feel, tactile touch, loft, and other aesthetic ratings. Natural-fiber knits have held a decisive edge, speaking realistically, in certain fabric constructions. For knitters who wish to use Orlon acrylic fiber more widely, this problem of absence of crimp recovery has been costly to all concerned, and the elimination of that barrier was selected early in the game as a prime technical objective for more universal acceptance of our product.

Our research objective can in some cases head down a road where functionality as well as aesthetics is the goal. The de-

(*Continued on Next Page*)

velopment of Lycra spandex fiber is a key example.

Over a long period, our research divisions have sought a true elastic yarn. The specifications laid down for such a yarn included:

1. Exceptional power or retractive force enabling fine-count lightweight fibers to do the job of traditional heavy elastics.

2. Good mill processability, enabling mill efficiencies as nearly comparable as possible with familar non-elastic fibers such as nylon, "Dacron" polyester fiber, and rayon.

3. Dyeability under standard commercial conditions.

Considerable research effort was devoted over the years to study of nylon, Dacron, and other polymers, but all proved lacking in one or more critical elastomer properties. The advent of polyurethane chemistry in time provided the long-sought approach. Our Pioneering Research Laboratory research teams developed, modified, and standardized polyurethane materials into the fiber which is now known as Lycra.

On the next slide, these curves show the retractive forces for Lycra spandex fiber and two compounds of rubber thread as measured by grams per denier. These comparisons indicate a successful outcome to the original goal specification covering needs for fine-count, lightweight elastic fibers for textile application. The other goal requirements were also met.

There is, of course, more to the story of Lycra. As many know, the product itself is being produced in pilot facilities today and is in extremely limited supply. Under the circumstances, our introduction has been concentrated mainly in women's foundation garments. Limited trials of Lycra in knit goods — primarily swim suits and sock tops—do suggest important knitting demand should also grow for this research-born fiber as future availability permits. As with Orlon Sayelle bicomponent acrylic fiber, the development of Lycra illustrates how experienced fiber research teams aiming for well understood textile goals — whether aesthetic or functional or both— can aid the textile manufacturer toward constantly better end products.

Other indications of this principle are being seen currently in Orlon Cantrece acrylic filament and Antron trilobal multifilament texturing yarns for clean-look sweater and dress knits.

In the case of Antron, cross-section control has been taken as the main line of research. The specific trilobal cross section which we have engineered in our yarns contributes distinctive luster or "highlight" effect, good touch, and freedom from picking. Shortcomings of older textured knitting yarns in these respects are only too familiar to many of you, and our nylon technical people have long recognized the long-term health of the textured - yarn business hinged on an aesthetic breakthrough.

"New fibers" is Chapter I in the Du Pont guidebook of "creative selling." We look upon our broad research effort for product renewal as the foundation for all later steps. Results to date strongly suggest knitters may expect "something new from Du Pont" will continue to mean something new in the market and in consumer demand. Even though initial supplies are, of necessity, limited, we will want to continue work with you in evaluating the new products.

Record Attendance At NKOA Banquet

(*Continued from Page* 1)

garment manufacturer trade groups.

Two projects sponsored by the National Knitted Outerwear Association in the areas of quality control were intensively discussed during the morning session of the convention in papers presented by the management consultants engaged by NKOA to conduct the studies.

Bertrand Frank, of Bertrand Frank Associates, reported on quality control in the sewing, cutting and general fabrication of sweaters. A newer control project initiated by the Association was covered by T. A. Podbereski, who outlined production procedures for knitting yarns and the knitting of fabrics and sweater strips.

The Tuesday board meeting was presided over by James F. Nields, Ware Knitters, Inc., president of the Association for the past year. Sidney S. Korzenik, NKOA executive director and counsel, made his annual industry report to the directors, including a survey of general knitwear trends during the past year. Other matters on the agenda were reports on the NKOA book publication program; coverage of recent research activities; and continued consideration of exports from abroad, most particualrly from Japan.

A survey of labor relation developments in the industry was presented by Harold Korzenik, Association counsel. Edward A. Brandwein, NKOA administrative secretary, detailed the extensive promotional activities of the Knitted Outerwear Foundation.

The banquet was opened by an invocation by the Rev. Robert L. Stern, son of Lester Stern, of Sternwild Knitting Mills.

James F. Nields, Jr., re-elected president of the Association was introduced by Mr. Korzenik and addressed by the banquet gathering. The gala event was brought to a finale by a program of entertainment headed by comedian Alan King.

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Metropolitan area. Fully equipped, from knitting to finishing, producing fine gauge and bulky sweaters. 1500 dozen per week capacity.

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2 R.O.F.'s, 24", 32 feed 18 or 20 cut
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May be seen in operation.

Both machines in practically new condition.

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5 Dubied fashioned collar machines, top working condition, 13 gauge. Will also widen automatically. Also fine gauge machine:

1 Dubied RAL 55", 14 gauge
1 Dubied RAC 55", 14 gauge
1 Dubied BAZ 55", 14 gauge
1 Dubied ABG 40", 12 cut, 8 locks

Reasonably priced

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One of the Top Mills in the country, noted for its equipment which is complete, modern and well-kept. Estimated value of plant is over $350,000.00 Liquidation is to be conducted through our New York office and from the office of Shelley Knitting Mills located at 1215 Glenwood Avenue, Philadelphia, Penna. Baldwin 6-0110.

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2—Phila. Jacq. TAI, 8¾ cut, 30″, 12 feed, 4 color strip.
2—Phila. Jacq. TAI, 9¼ cut, 30″, 12 feed, 4 color strip.
1—Phila. Jacq. TAI, 10 cut, 30″, 12 feed, 4 color strip.
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2—Phila. Jacq. TAI, 13½ cut, 30″, 12 feed, 4 color strip.
6—Phila. Jacq. TAI, 16½ cut, 30″, 12 feed, 4 color strip.
4—Phila. Jacq. TA, 14″, 15″, 16″, 17″, 10, 11½ & 12 cut, 4 feed
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1—Phila. Jacq. LH, 8 cut, 30″, 6 feed, 3 color strip.
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4—Universal "Supramats" 62″, 10 cut, 4 Bar, Motor and Stop Motion
5—Universal "Supramats" 62″, 12 cut, 4 Bar, Motor and stop motion
4—Universal "Supramats" 62″, 4 cut, 4 Bar, Motor and stop motion
2—Queens Model "B", 60″, 10 & 12 cut, High & Low needles, Jacks
2—Border Machines, 8 and 10 cut, Double Head
4—Leighton Brass Ringers, 5 cut, 2 feed
1—Leighton Racker, 10½″, 7 cut, 3 color strip.
1—Leighton Transfer, 19″, 10 cut, 6 feed
2—Leighton Transfers, 32″, 34″, 6 & 10 cut, 9 feed 4 color strip.
2—Reiner Rachel Machines, 98″, 18 Gauge, 4 Guide Bars
1—Sipp Warp Mill with Creels and Guides. Used for striped borders

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2—Singer Sewing Machines, Model 241-13
22—Singer Sewing Machines, Assorted Model #s
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3 Stafford & Holt, 7 gauge, 30", and 32". 3 Color stripers, short change system with motors, equipped with Wesco stop motion in running order.

BOX 190N

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KNITTING SECTION

"Interlock Knitting—A Review of the Various Types of Sweater-Strip Machines"
"How to Knit Basic Bulky Rib Knit Structures"
"Characteristics of Basic Stitches for Bulky Rib Knits"
"Characteristics of Welt Selvedges for Sweaters"
"Yarn Length Measuring Devices Used for Quality Control in Knitting"
"Facts About Circular High-Pile Fabric Machines"
"Review of Recent Developments in Rashel and Tricot Machinery"
"How to Knit Sweaters of the Type 21 Orlon"
"Knitting Glossary"

SEWING SECTION

"Conveyor Systems for Knitwear Sewing Rooms"
"Typical Layouts for Knitwear and Swimwear Sewing Departments"
"Glossary of Basic Sewing Stitches"
"Facts About Sewing Machines for Knitwear and Swimwear"

FIBER AND YARN SECTION

"New Dimensions in Orlon for Knitwear"
"Facts About Specialty Hair Fibers"
"Review of Non-Cellulosic Synthetic Staple Fibers"
"Trends in Modified Continuous Filament Yarns for Knitting"
"Comparison of Spinning Systems for Orlon"
"Fiber and Yarn Glossary"

DYEING AND FINISHING SECTION

"How to Nap and Shear Orlon Sweaters"
"Thermo-Setting of Textured Nylon Knits"
"Procedure in Package-Dyeing Machine Knitting Yarns"
"Roller Printing of Circular Knitted Fabrics"
"Resin Finishing of Cotton Knitted Yardgoods"
"Dyeing of Circular Knitted Fabrics of Orlon and Wool"
"How to Dye Darvan Type X-7 Fiber"
"How Natural Fibers Used in Knitted Outerwear are Dyed"
"Optical Bleaches for Sweaters and Knitted Yardgoods of all Fibers"
"Anti-Curl Agents for Tubular Knitted Jersey Yardgoods"
"Weighters for Circular Knitted Yardgoods of all Types"
"Dye Routes for Type 42 Orlon"
"Glossary of Dyeing Terms"

SWIMWEAR SECTION

"How to Control Tension of Rubber Yarn Used in Knitting Elasticized Swimwear Fabrics"
"Steps in the Manufacture of Swimwear Fabrics"
"Basic Construction Features of the Swim Suits"
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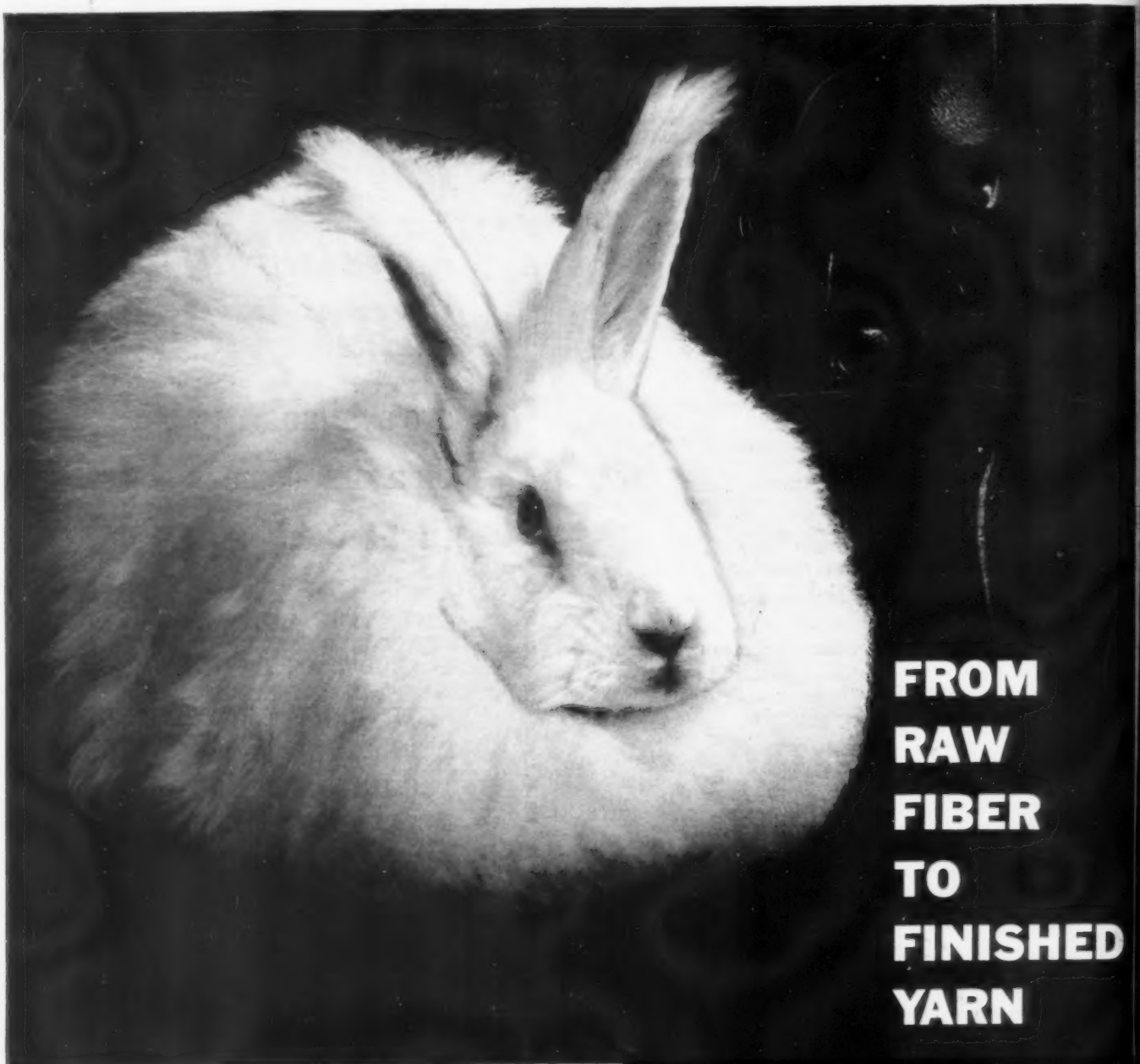

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